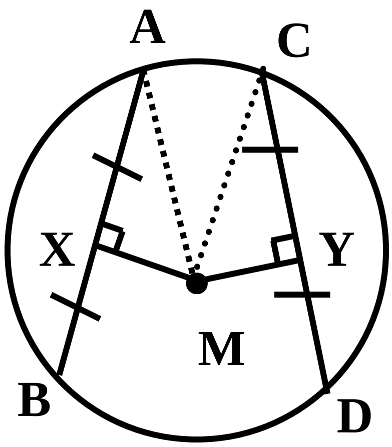
Theorem

If chords of a circle are equal in length , then they are equidistant from the centre.



Given :

$AB = CD$, $\overline{MX} \perp \overline{AB}$, $\overline{MY} \perp \overline{CD}$

R.T.P. $MX = MY$

Constraction : draw $\overline{MA}$ and $\overline{MC}$

Proof : In $\Delta\ \Delta$ AMX , CMY

1) $AX = CY$ $\left(AX = \frac{1}{2} AB = \frac{1}{2} CD = CY \right)$

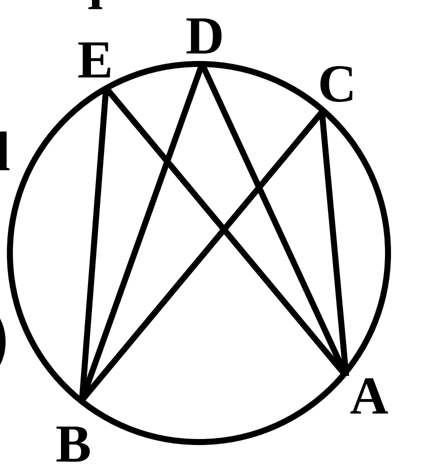
2) $MA = MC = r$

3) $m(\angle AXM) = m(\angle CYM) = 90^\circ$

$\therefore\ \Delta\ AMX \equiv \Delta\ CMY \quad \therefore\ MX = MY$

Theorem

In the same circle, the measures of all inscribed angles subtended by the same arc are equal.



Given :

$\angle$ C , $\angle$ D and $\angle$ E are inscribed angles subtended by AB

R.T.P. $m(\angle C) = m(\angle D) = m(\angle E)$

$$\text{Proof : } \because\ m(\angle C) = \frac{1}{2} m\left(\overset{\frown}{AB}\right)$$

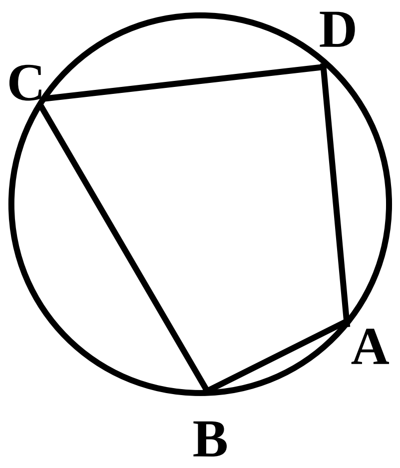
$$, m(\angle D) = \frac{1}{2} m\left(\overset{\frown}{AB}\right)$$

$$, m(\angle E) = \frac{1}{2} m\left(\overset{\frown}{AB}\right)$$

$$\therefore m(\angle C) = m(\angle D) = m(\angle E)$$

Theorem

In a cyclic quadrilateral , each two opposite angles are supplementary



Given : ABCD is a cyclic quadrilateral

R.T.P. 1) $m(\angle A) + m(\angle C) = 180^\circ$

2) $m(\angle B) + m(\angle D) = 180^\circ$

$$\text{Proof : } m(\angle A) = \frac{1}{2} m\left(\overset{\frown}{BCD}\right)$$

$$m(\angle C) = \frac{1}{2} m\left(\overset{\frown}{BAD}\right)$$

$$\therefore m(\angle A) + m(\angle C) = \frac{1}{2}\left[m\left(\overset{\frown}{BCD}\right) + m\left(\overset{\frown}{BAD}\right)\right]$$

$$= \frac{1}{2}\text{ the measure of the circle}$$

$$= \frac{1}{2} \times 360^\circ = 180^\circ$$

$$\text{Similarly : } m(\angle A) + m(\angle C) = 180^\circ$$

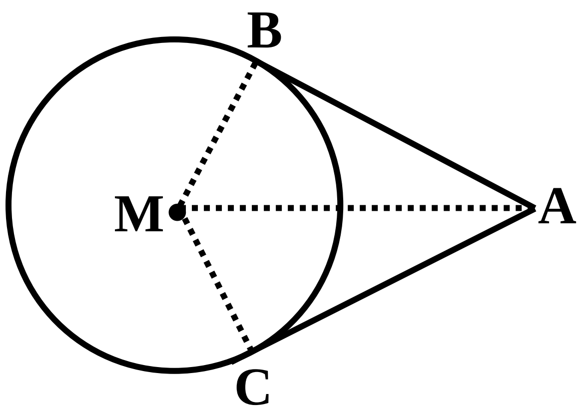
Theorem

The two tangent – segments drawn to a circle from a point outside it are equal in length.

Given : $\overline{AB}$ and $\overline{AC}$ are two tangent – segments

R.T.P. AB = AC

Construction : draw $\overline{MB}$, $\overline{MC}$, $\overline{MA}$



Proof : In Δ Δ ABM , ACM

1) MB = MC = r

2) $\overline{AM}$ is a common side

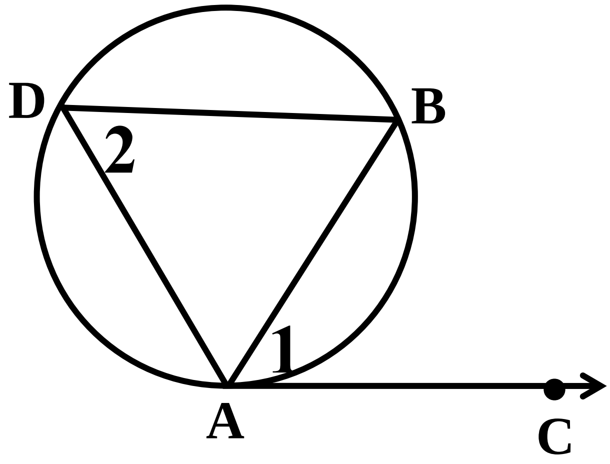
3) $m(\angle ABM) = m(\angle ACM) = 90^\circ$

(where $\overleftrightarrow{AB}$ and $\overleftrightarrow{AC}$ are two tangents)

∴ Δ ABM ≡ Δ ACM   ∴ AB = AC

Theorem

The measure of the angle of tangency is equal to the measure of the inscribed angle subtended by the same arc



Given : $\angle$ BAC is an angle of tangency and $\angle$ D is an inscribed angle.

R.T.P. $m(\angle BAC) = m(\angle D)$

Proof : $\because \angle$ BAC is an angle of tangency.

$\therefore m(\angle BAC) = \frac{1}{2} m(\overset{\frown}{AB})$ ....(1)

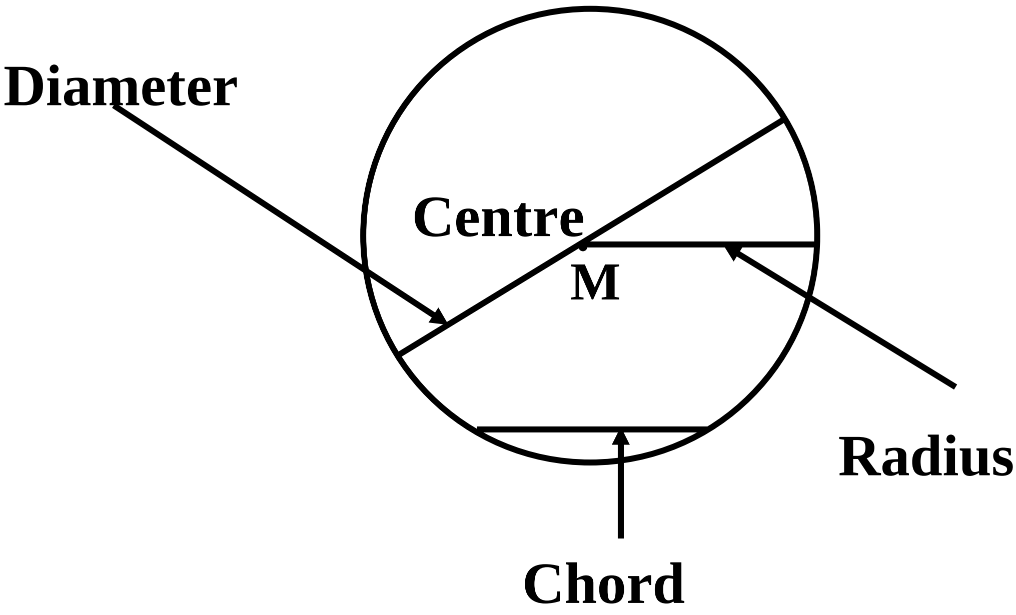
$\because \angle$ D is an inscribed angle

$\therefore m(\angle D) = \frac{1}{2} m(\overset{\frown}{AB})$ ....(2)

From (1) and (2) , we deduce that

$m(\angle BAC) = m(\angle D)$

<u>The circle:</u> **is the set of points of a plane, which are at a constant Distance from a fixed point**



The symmetry of the circle:

*** Any straight line passing Through the centre of a circle Is an axis of symmetry of it.**

*** The circle has an infinite number Of axes of symmetry.**

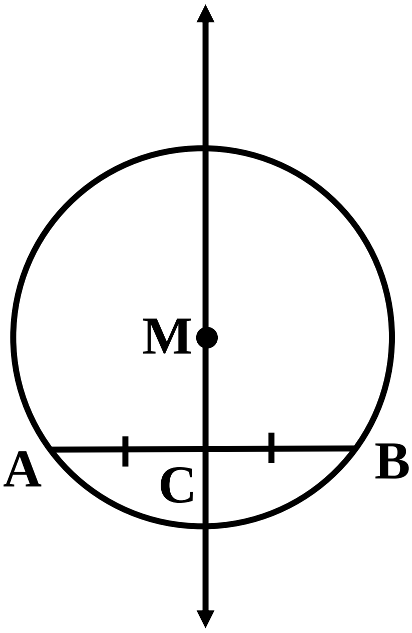
$$\text{The circumference of a circle} = 2\pi r$$

$$\text{The area of a circle} = \pi r^2$$

Corollary (1)

The straight line passing through the centre of a circle and the midpoint of any chord of it is perpendicular to this chord.

if $\overline{AB}$ is a chord of a circle M and $\overleftrightarrow{MC}$ is drawn where C is is the midpoint of $\overline{AB}$, then: $\overleftrightarrow{MC} \perp \overline{AB}$



Corollary (2)

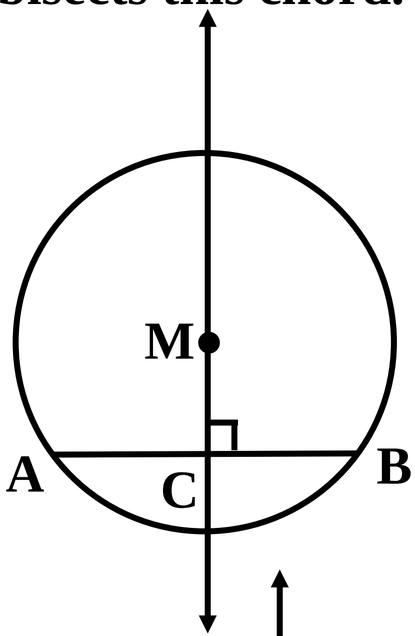
The straight line passing through the centre of a circle and perpendicular to any chord of it bisects this chord.

If $\overline{AB}$ is a chord of a circle M

And $\overleftrightarrow{MC}$ is drawn where

$\overleftrightarrow{MC} \perp \overline{AB}$ And $\overleftrightarrow{MC} \cap \overline{AB} = \{C\}$,

Then $\overleftrightarrow{MC}$ bisects $\overline{AB}$ at C



Corollary (3)

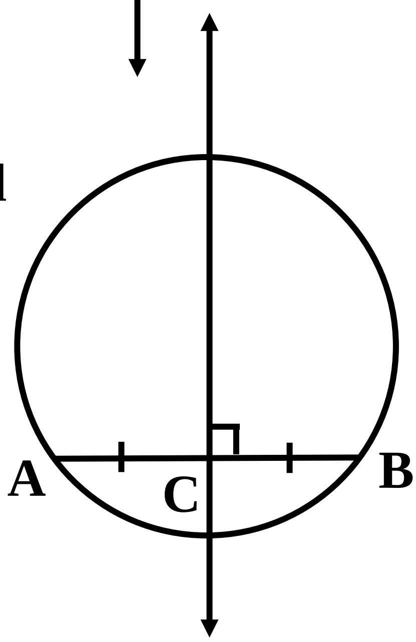
The perpendicular bisector of any chord of a circle passes through the centre of the circle.

If $\overline{AB}$ is a chord of a circle M

The straight line $L \perp \overline{AB}$ and L

Bisects $\overline{AB}$ at C, then:

$M \in$ The straight line L



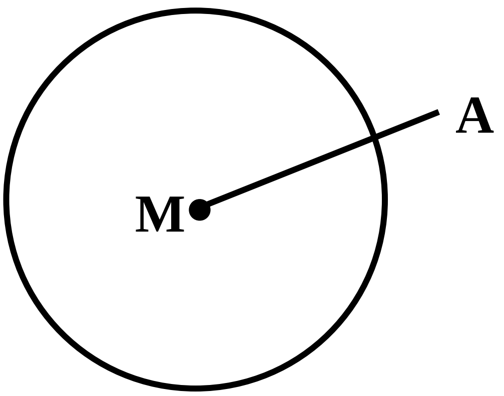
Then the axis of symmetry of any chord Of a circle passes through its centre, so this axis is an axis of symmetry of the circle.

Position of a point with respect to a circle

If M is a circle with radius length r and A is a point in its plane, then

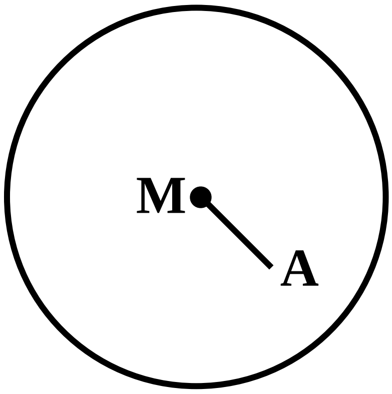
1) A is outside the circle

If MA > r



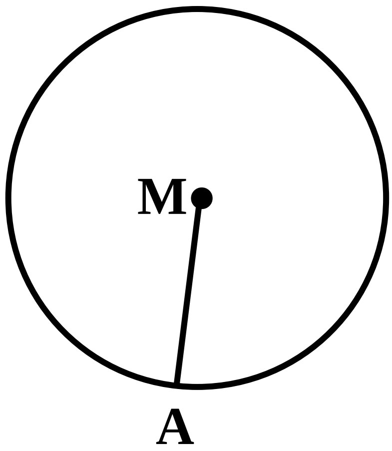
2) A is inside the circle

If MA < r



3) A ∈ the circle

MA = r



Position of a straight line With respect to a circle

1) MA > r then L is outside the circle

2) MA = r then L is a tangent

3) MA < r then L is a secant

Position of a circle with respect to another circle

1) $MN > r_1 + r_2$ the two circles are distant
2) $MN = r_1 + r_2$ the two circles are touching externally
3) $r_1 - r_2 < MN < r_1 + r_2$ the two circles are intersecting
4) $MN = r_1 - r_2$ the two circles are touching internally
5) $MN < r_1 - r_2$ the two circles are one inside the other
6) MN = zero the two circles are concentric

Theorem

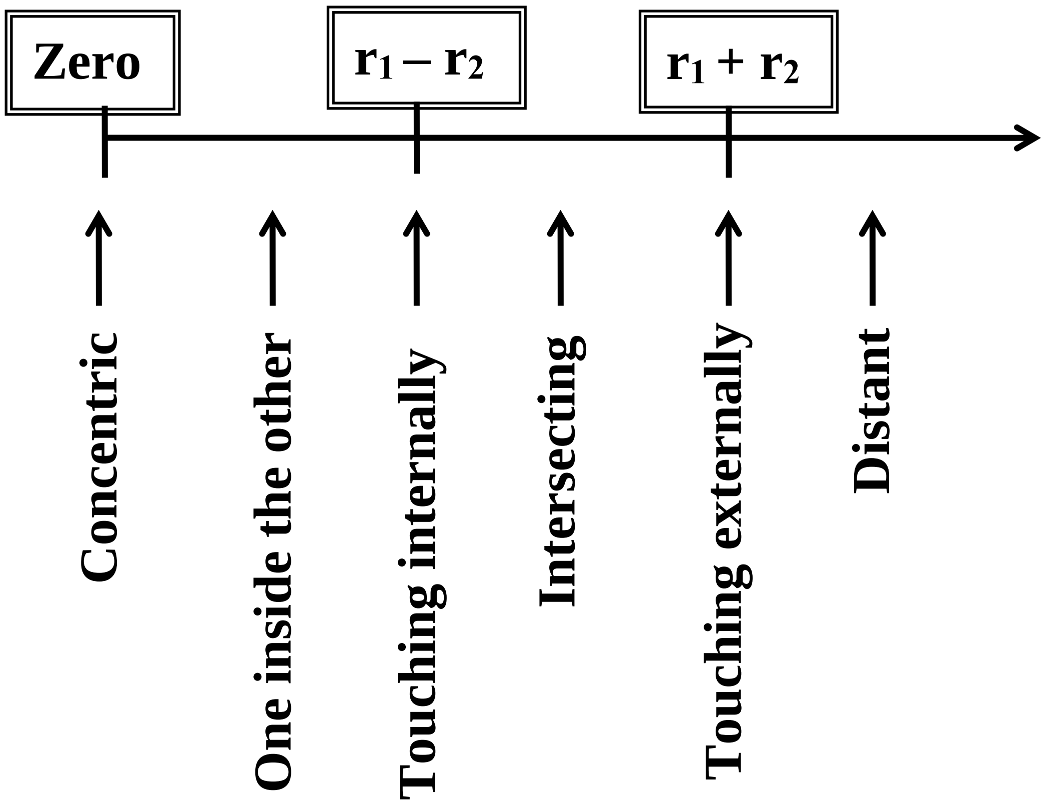
If the chords are equal in length, then they are equidistant from the centre.

Corollary

The circle that passes through the vertices of a triangle is called the circumcircle of this triangle.
And the centre
1) Acute inside
2) Obtuse outside
3) Right the midpoint of the hypotenuse

Number of circle passes through the figures

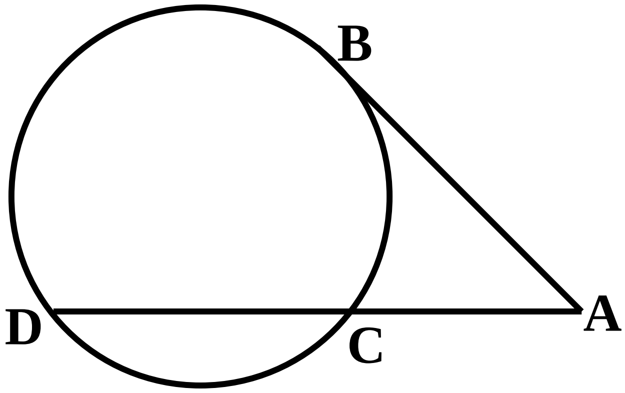
1) Point infinite
2) Two points infinite
3) Three collinear points zero
4) Three non collinear points one
5) Parallelogram zero
6) Rhombus zero
7) Rectangle one
8) Square one
9) Isosceles trapezium one



* The centre of the circumscribed of the vertices of a triangle is the intersection of the axes of symmetry of the sides of a triangle
* The centre of the inscribed circle of a triangle is the intersection of the bisectors of the interior angles of a triangle
* There are an infinite number of circles passing through a given point.
* There are an infinite number of circles passing through a given two points.
* There is no circle passing through three collinear points
* There is one circle passing through three non – collinear points.
* There is one circle passing through

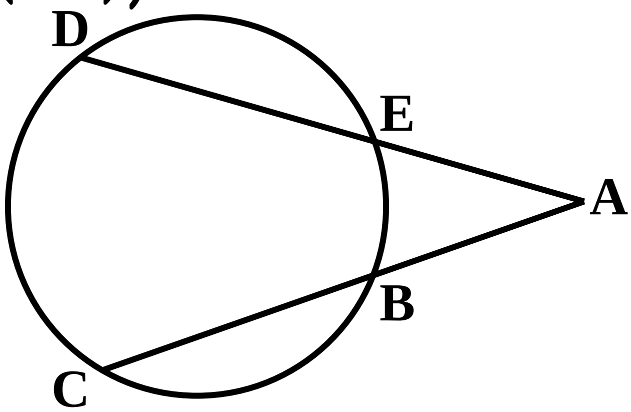
1) Triangle 2) square
3) Isosceles trapezium 4) Rectangle

* $AB^2 = AC \times AD$



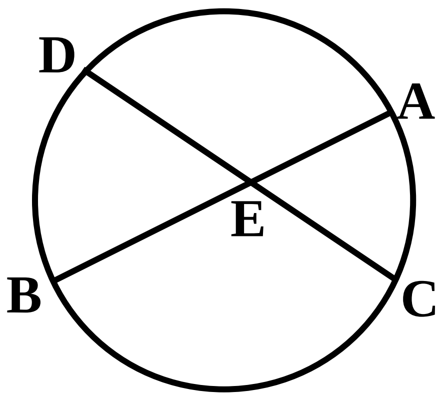
* $m(\angle A) = \frac{1}{2}\left(m(\overset{\frown}{DC}) - m(\overset{\frown}{BE})\right)$

* $AE \times AD = AB \times AC$



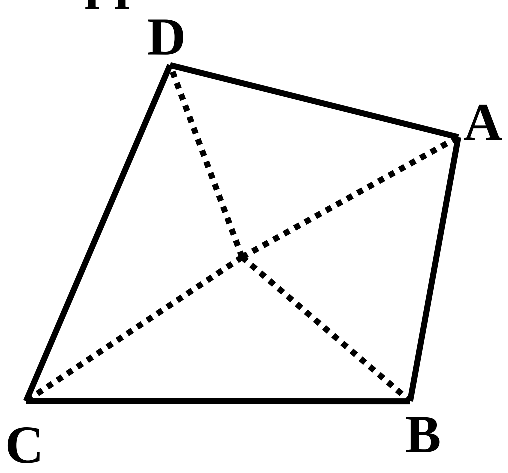
* $m(\angle AEC) = \frac{1}{2}\left(m(\overset{\frown}{DB}) + m(\overset{\frown}{AC})\right)$

* $AE \times EB = CE \times ED$

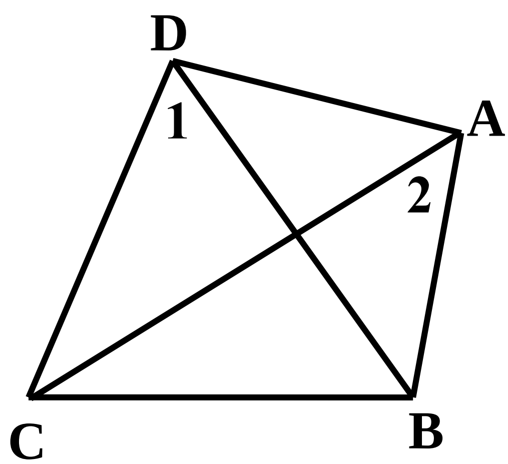


The quadrilateral is a cyclic if one of the following conditions is verified:

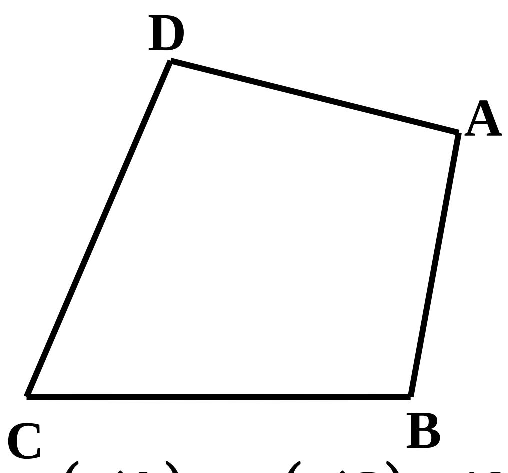
1) **If there is a point in the plane of the figure such that it is equidistant from its vertices.**
2) **If there are two equal angles in measure and drawn on one of its sides as a base and on one side of this side.**
3) **If there are two opposite supplementary angles " their sum = 180 "**
4) **If there is an exterior angle at any of its vertices equal in measure to the measure of the interior angle at the opposite vertex.**



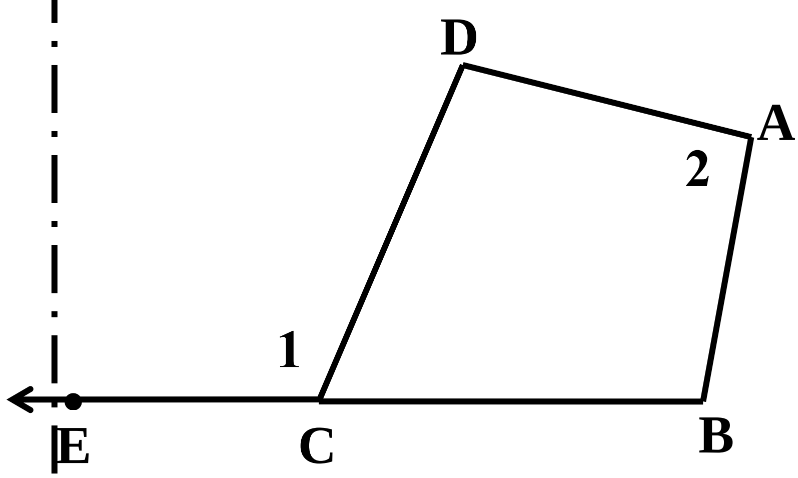
$MA = MB = MC = MD$



$m(\angle 1) = m(\angle 2)$

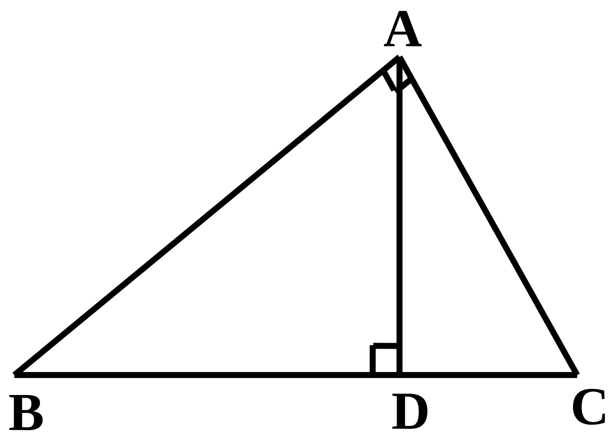


$m(\angle A) + m(\angle C) = 180^\circ$



$m(\angle 1) = m(\angle 2)$

1) $(BC)^2 = (AC)^2 + (AB)^2$



2) $(AC)^2 = (BC)^2 - (AB)^2$
3) $(AB)^2 = (BC)^2 - (AC)^2$
4) $(AB)^2 = BD \times BC$
5) $(AC)^2 = CD \times CB$
6) $(AD)^2 = DC \times DB$
7) $(AC)^2 = (AD)^2 + (DC)^2$
8) $(AB)^2 = (AD)^2 + (DB)^2$
9) $(AD)^2 = (AC)^2 - (DC)^2$
10) $(AD)^2 = (AB)^2 - (BD)^2$

11) $AD = \dfrac{AC \times AB}{BC}$

12) $BC = \dfrac{AC \times AB}{AD}$

13) $AC = \dfrac{AD \times BC}{AB}$

14) $AB = \dfrac{AD \times BC}{AC}$

Number of axes

parallelogram		rhombus		rectangle		square
0		2		2		4
Isosceles	1	Equilateral	3	Scalene	٠	

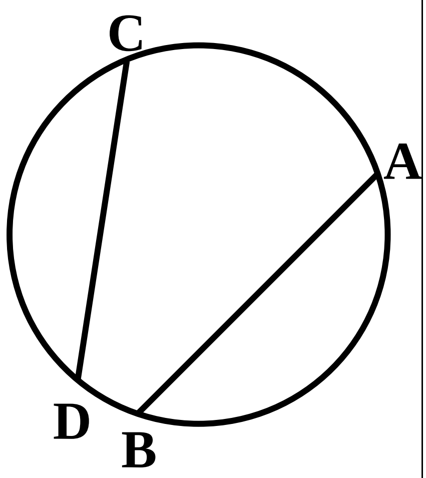
The name of the figure	Its perimeter	Its area
Triangle	The sum of the lengths of its sides	$\frac{1}{2} \times b \times h$ b : base length h : the length of the height
Parallelogram	$2 (b_1 + b_2)$	$b_1 \times h_1 = b_2 \times h_2$ b_1 , b_2 are two adjacent sides h_1 , h_2 are the corresponding heights
Rectangle	$(L + W) \times 2$	$L \times W$ L : the length W : the width
Square	4 s	$s^2 = \frac{1}{2} d^2$ s : the side length d : the length of the diagonal
Rhombus	4 s	$s \times h$ or $\frac{1}{2} d_1 d_2$ s : side length d_1 , d_2 : the length of the two diagonals
Trapezium	The sum of the lengths of its sides	$\frac{1}{2}(b_1 + b_2) \times h$ or $b \times h$ b_1 , b_2 : the length of the two bases and b : the length of the middle base , h : the height

$C = 2\pi r = D \times \pi$ $\qquad$ $A = \pi r^2$

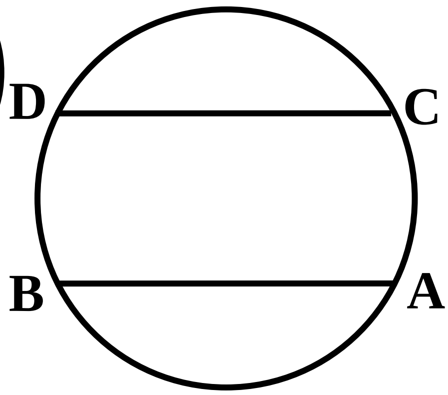
$$\frac{L}{2\pi r} = \frac{m}{360^\circ}$$

If $AB = CD$ then $m(\overset{\frown}{AB}) = m(\overset{\frown}{CD})$

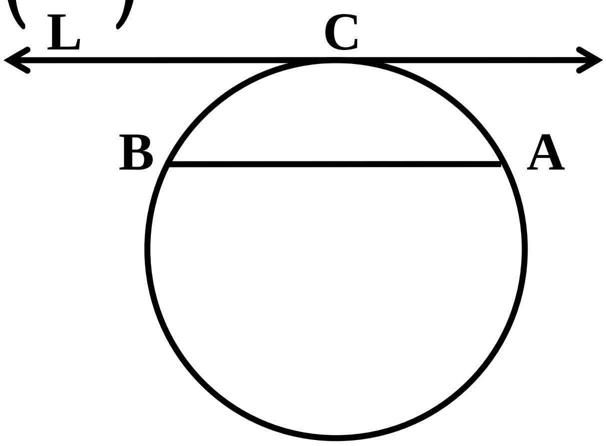
the length of $\overset{\frown}{AB}$ = the length of $\overset{\frown}{CD}$



If $\overline{AB} \parallel \overline{CD}$ then $m(\overset{\frown}{AC}) = m(\overset{\frown}{BD})$



If $L \parallel \overline{CD}$ then $m(\overset{\frown}{AC}) = m(\overset{\frown}{CB})$



[1] Complete:

1) If the point A $\in$ the circle M whose diameter length = 8 cm , then MA = ...cm

2) If M and N are two circles touched internally the radius of one of them = 3 cm , MN = 8 cm then the radius of the other circle = ...

3) The circle M with radius 5 cm touch externally the circle N , if MN = 7 cm then the circumference of the circle N = ...cm

4) M and N are two intersecting circles . the two radii length are 3 cm and 4 cm respectively then :

MN $\in$ ....

5) If the area of the circle M = 16 π cm^2 , A is a point on its plane where MA = 8 cm. then A is .... circle M

6) Circle M with radius length of 6 cm , if the straight line L is outside the circle then the distance of the centre of the circle from the straight line L $\in$ ....

7) A circle with diameter length (2 x + 5) cm , the straight line L is a distant from its centre by (x + 2) cm then the straight line L is ....

8) The number of circles that passes through two given points is ....

9) Any three points do not belong to one straight line .... passes through them

10) The circle passing through the vertices of a triangle is called a ....

11) The center of the circle passing through the vertices of a triangle is the point intersecting its ......

12) If the right angled triangle ABC at B , then the centre of the circle passing through its vertices is ....

13) The number of circles that can pass through any three vertices of a parallelogram is ....

14) The chord of the circle is the drawn line segment between ....

15) The straight line passing vertically on the center of the circle on any chord in it ....

16) The line of two centres of two circles touching internally passes ....

17) The centre of the circumscribed circle about the triangle is the intersection of ....

18) The chords of equal length in circle ....

19) A tangent to a circle of diameter length 6 cm is at a distance of .... cm from its centre.

20) A circle can be drawn passing the vertices of a .....

(Rhombus , rectangle , trapezium , parallelogram)

21) $\overline{AB}$ is a diameter in circle M , $\overleftrightarrow{AC}$ and $\overleftrightarrow{BD}$ are two tangents to the circle , then $\overleftrightarrow{AC}$ .... $\overleftrightarrow{BD}$

22) A circle with a circumference of 6 π cm , and the straight line L is a distant from its centre by 3 cm , then the straight line L is ......

23) M and N are two intersecting circles , both their radii length are 3 cm and 5 cm , then MN ∈ ....

24) Any three points that do not belong to one straight line include ....

25) The axis of symmetry of the two circles M and N that are intersecting at A and B is ....

26) If AB = 7 cm , then the area of the smallest circle passing through the two points A and B = …… cm^2

27) A chord with 8 cm length. The length of its radius is 5 cm , then it is distant from its centre by ……. Cm.

28) If M circle with radius length 7 cm and $\overline{MA} \perp$ L where A ∈ L , complete the following:

a) If MA $= 4\sqrt{3}$ cm , then the straight line L is .....

b) If $MA = 3\sqrt{7}$ cm , then the straight line L is ....

c) If $2\,MA - 5 = 9$ cm , then the straight line L is ......

d) If the straight line L intersects circle M and $MA = 3x - 5$ then $x \in$ ....

e) If the straight line L is tangent to the circle M and $MA = x^2 - 2$ then $x \in$ ....

29) If M is a circle with radius length $= 4$ cm and A is a point in its plane , complete:

a) If $MA = 4$ cm , then A is .... circle M , because ....

b) If $MA = 2\sqrt{3}$ then A is .... circle M because ....

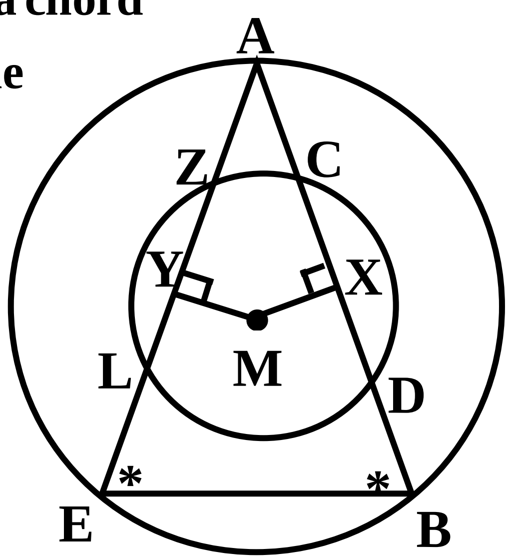
c) If $MA = 3\sqrt{2}$ cm , then A is .... circle M because ....

d) If MA = zero , then A is .... circle M and represented by ....

[2]

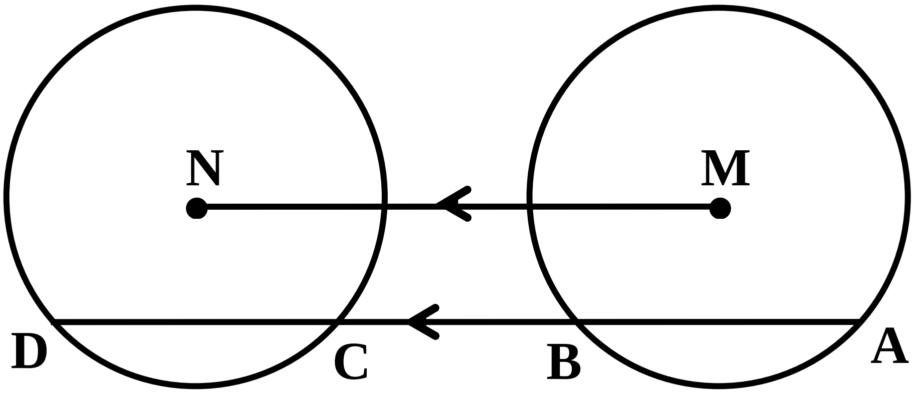
Two concentric circles M , $\overline{AB}$ is a chord in the large circle and intersects the smaller circle at C and D , $\overline{AE}$ is a chord in the larger circle and intersects the smaller circle at Z and L. if $m(\angle ABE) = m(\angle AEB)$ then prove that:

$CD = ZL$



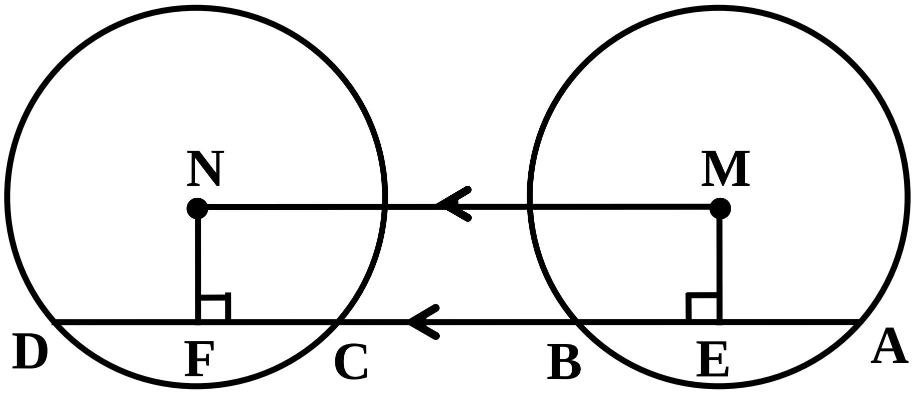
[3] In the opposite figure:

M and N are two congruent circles, $\overleftrightarrow{AB} // \overleftrightarrow{MN}$ was drawn and intersecte circle M at A and B and intersectcircle N at C and D
Prove that: AC = BD



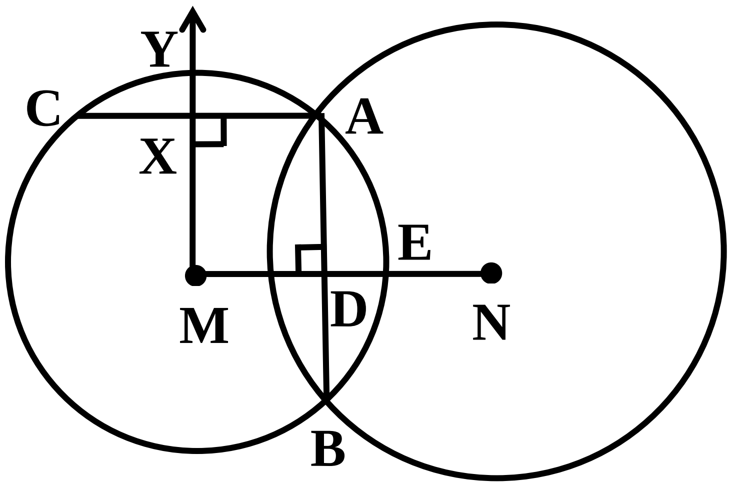
Construction:

Draw $\overline{ME} \perp \overleftrightarrow{AD}$, $\overline{MF} \perp \overleftrightarrow{AD}$



[4] In the following figure:

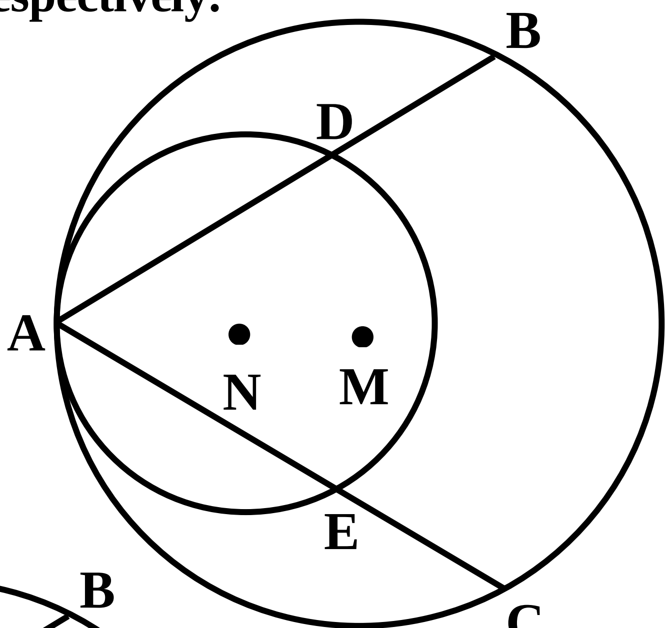
The two circles M and N intersectat A and B. is drawn $\overrightarrow{MX} \perp \overline{AC}$ intersects $\overline{AC}$ at X and intersectcircle M in Y, $\overline{MN}$ is drawn $\overline{AB}$ to intersect $\overline{AB}$ at D and circle M at E. if AC = AB
Prove that: XY = DE.



[5]

Two circles M and N touch internally at A , $\overline{AB}$ and $\overline{AC}$ are two chords equal in length in the large circle and intersect the smaller circle at D and E respectively.

Prove that: AD = AE.



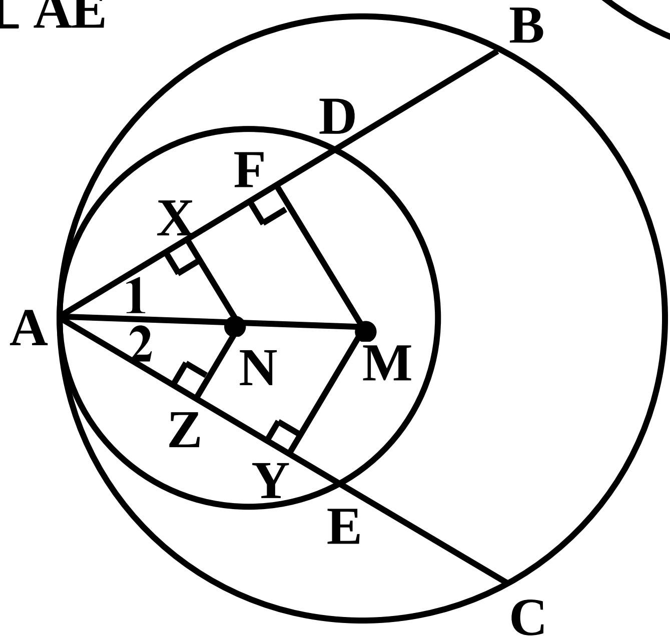
Construction:

Draw $\overline{MF} \perp \overline{AB}$

$\overline{MY} \perp \overline{AC}$

$\overline{NX} \perp \overline{AD}$

$\overline{MZ} \perp \overline{AE}$



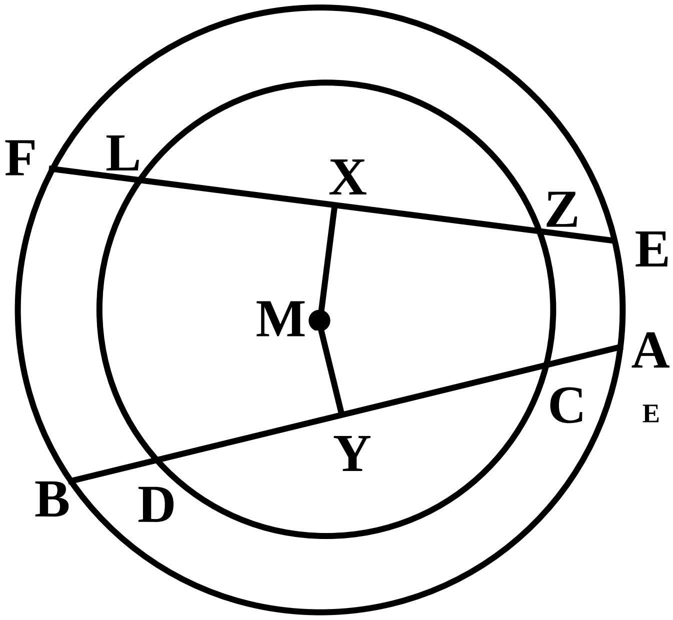
[6]

Two concentric circles M , $\overline{AB}$ is a chord in the larger circle and intersects smaller circle at C and D. $\overline{EF}$ is a chord in the larger circle and intersects the smaller circle at Z and L where AB = EF

Prove that :

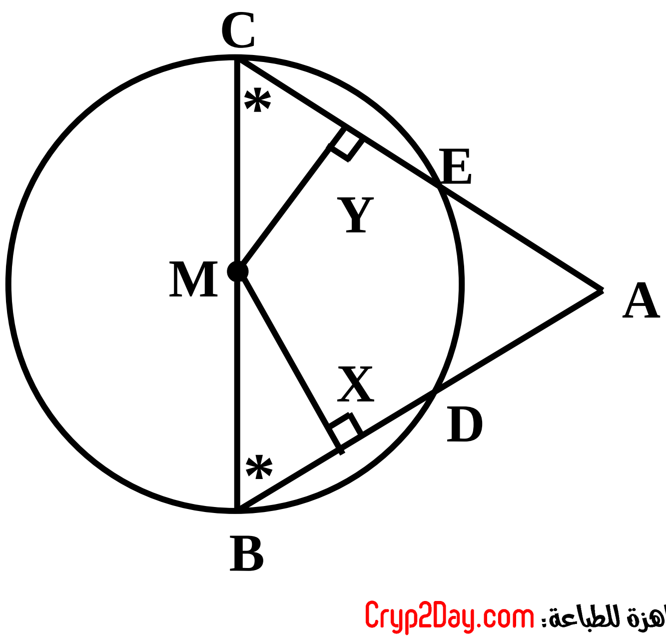
1) CD = ZL

2) AD = ZF



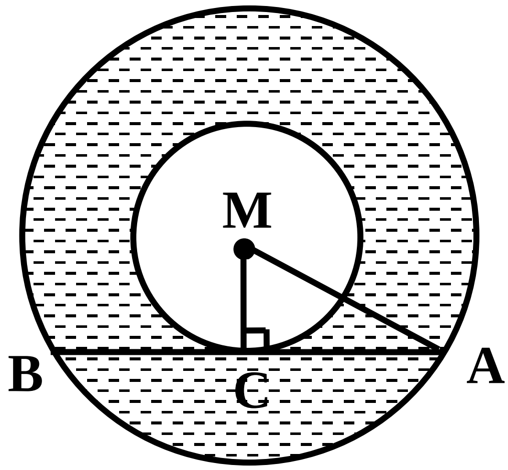
[7]

ABC is a triangle in which AB = AC. circle M was drawn with diameter $\overline{BC}$ intersecting $\overline{AB}$ at D and $\overline{AC}$ at E , $\overline{MX} \perp \overline{BD}$, $\overline{MY} \perp \overline{CE}$ prove that : BD = CE



[8]

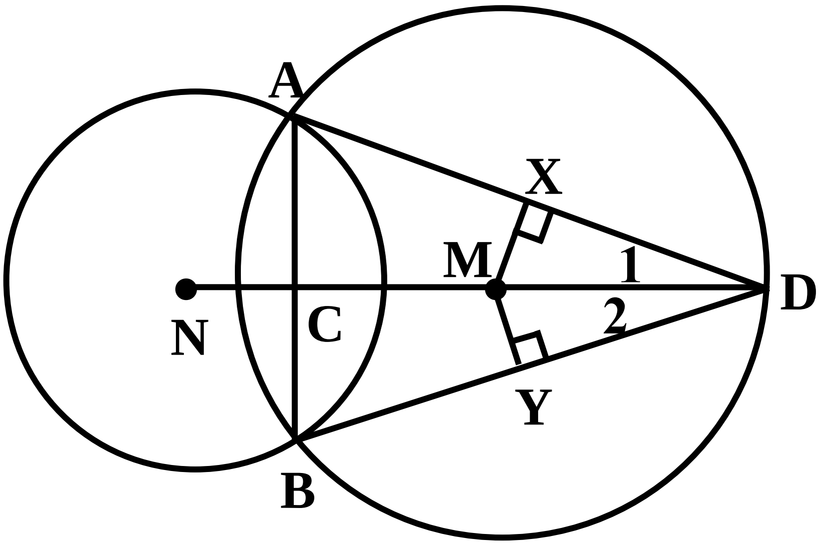
Two concentric circles in M , $\overline{AB}$ is a chord in the large circle and is a tangent to the smaller circle at C and the chaded area equals 16 π. find the length of $\overline{AB}$



[9]

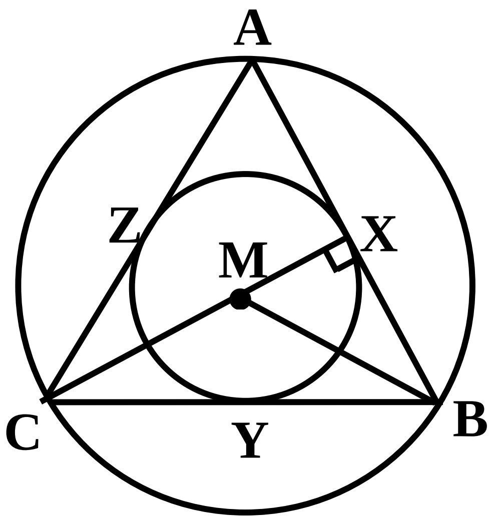
Circle M $\cap$ circle N = { A , B }, $\overleftrightarrow{AB} \cap \overleftrightarrow{MN} = \{ C \}$, D $\in \overleftrightarrow{MN}$

$\overline{MX} \perp \overline{AD}$, $\overline{MY} \perp \overline{BD}$, prove that : MX = MY



[10]

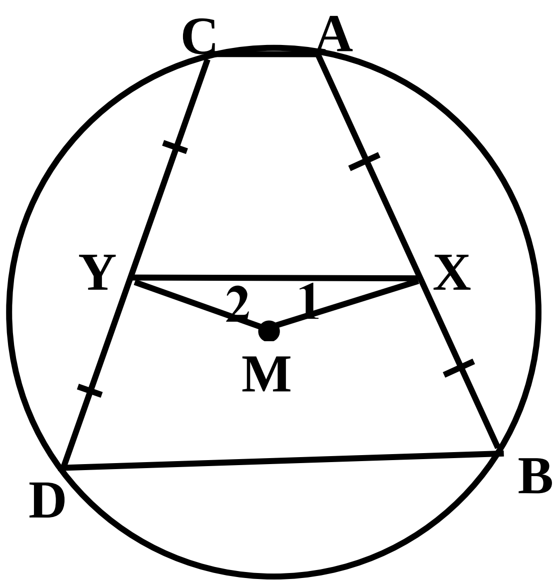
Two concentric circles M. their radii lengths are 4 cm and 2 cm. draw the triangle ABC where their verrtices are located on the large circle and its sides are touching the smaller circle at X , Y and Z prove that: the triangle ABC is equilateral triangle and find its area



[11]

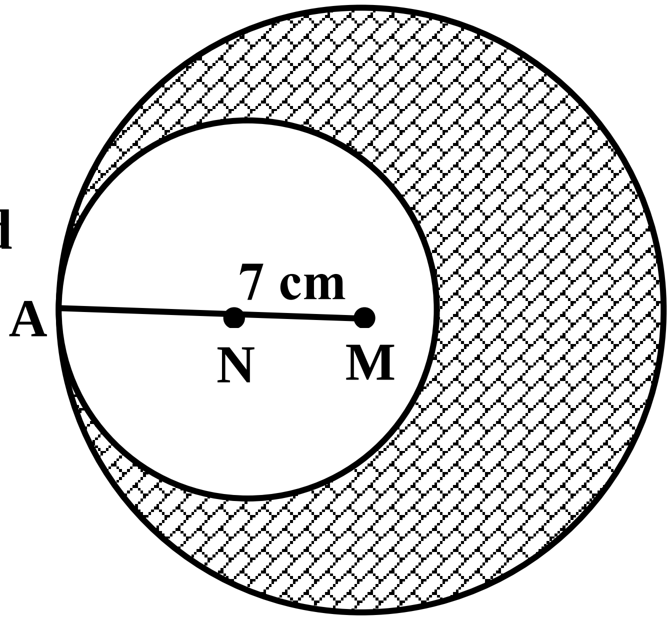
$\overline{AB}$ and $\overline{CD}$ are two equal chords in length in circle , X and Y are the two midpoints of $\overline{AB}$ and $\overline{CD}$ where B and D are in one side from $\overleftrightarrow{XY}$

Prove that: m(∠BXY) = m(∠DYX)



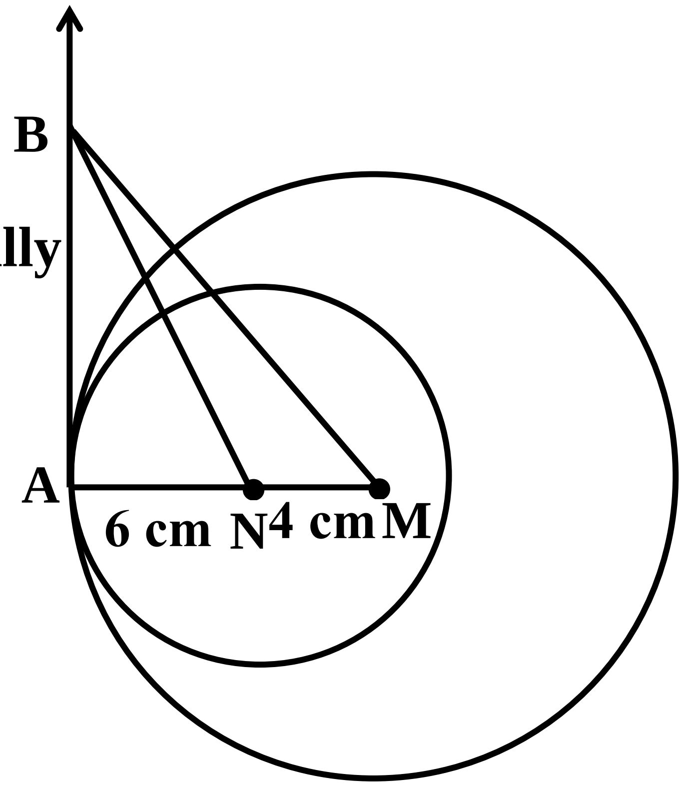
[12]

Two circles are touching internally at A. the shaded area equals 550 cm^2 MN = 7 cm. find the sum of both radii ($\pi = \frac{22}{7}$)

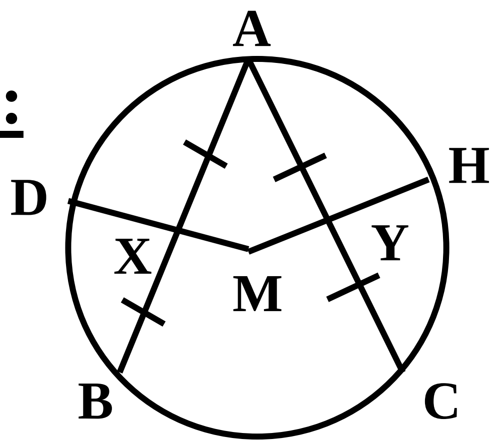


[13]

M and N are two circles with radii length of 10 cm and 6 cm respectively and are bothy touching internally at A, $\overleftrightarrow{AB}$ is a common tangent for both at A. if the area of the triangle BMN = 24 cm^2 find the length of $\overline{AB}$



[14*] In the opposite figure:

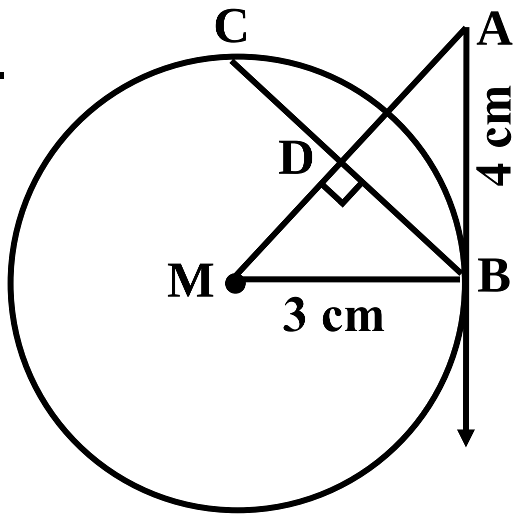


AB = AC, X is the mid-point

Of $\overline{AB}$, Y is the mid-point

Of $\overline{AC}$ prove that: DX = HY

[15*] In the opposite figure:



M is a circle, $\overline{BC}$ is a chord in it

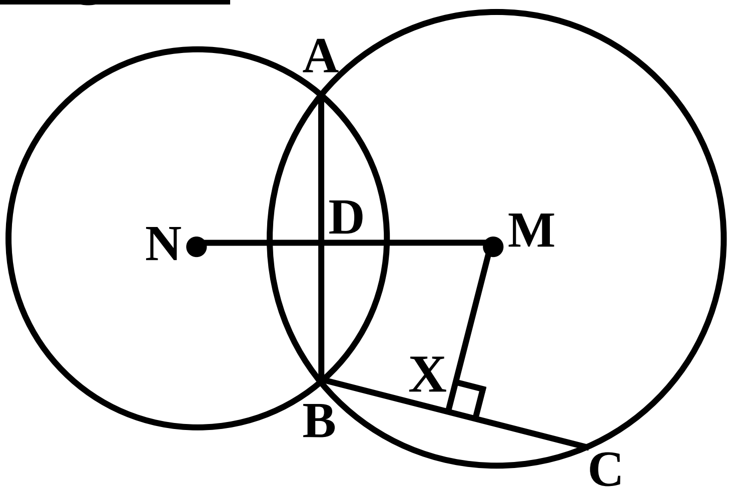
$\overrightarrow{BA}$ is a tangent at B.

$\overrightarrow{AM} \perp \overline{BC}$, $\overrightarrow{MA} \cap \overline{BC} = \{D\}$

MB = 3 cm and AB = 4 cm.

Find the length of $\overline{BC}$

[16*] In the opposite figure:



Two circles M and N

Intersect at A and B

MN = 7 cm, $\overline{MX} \perp \overline{BC}$

And AB = BC

1) If MX = 3 cm, find

The length of $\overline{DN}$.

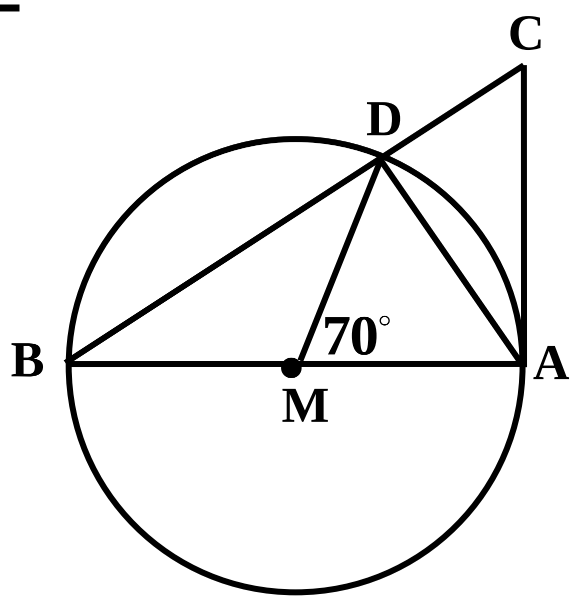
2) If AB = 8 cm, prove that : MB = 5 cm.

[17*] In the opposite figure:

$\overline{AB}$ is a diameter in the circle M

$\overleftrightarrow{AC}$ is a tangent to it at the point A if $m(\angle AMD) = 70^\circ$.

Find $m(\angle CAD)$



[18*] Complete :

1) The perpendicular bisector of any chord of a circle passes through ....
3) The tangent of a circle is perpendicular to the radius drawn at the point ....
4) The line of centers of two intersecting circles is .... to the common chord and ....
5) M and N are two circles , the lengths of their radii are 3 cm. and 6 cm. respectively , MN = 9 cm. , then the two circles are ....
6) The circle that passes through the vertices of a triangle is called .... of the triangle.
7) If the longest chord of a circle = 9 cm. , then its radius length = ...
8) M is a circle , the length of its diameter = 8 cm. if L is a straight line outside the circle , then the distance between L and the center M belongs to ....

[19*] Complete:

1) M and N are two circleswith radius 5 cm and 4 cm Respectively. If MN = 7 cm, then the two circles are ....

2) Two circles M and N are touching externally. If the Radius length of the circle M is 4 cm and MN = 7 cm, Then the circumference of the circle N = ………….cm.

3) If A and B are two points in a plane , AB = 6 cm , then the number of circles passing through the points A and B and radius of each is 5 cm = …………………………...

4) In the same circle, chords which are equidistant From the centre are ………………………………………

5) The number of circles that passes through the Vertices of a triangle is ……………………………………………

6) The number of axes of symmetry of rhombus is ……….

7) The line of centres of two intersecting circles is Perpendicular to the common chord and ……….…….…

8) If the surface of circle M $\cap$ the surface of the circle N = { a } , then the two circles are ………………………..….

9) A circle of diameter 8 cm. if a straight line L touches This circle at a point, then it is ……….......................cm distant from Its centre . ……….......................………........

10) It is impossible to draw a circle passing through the Vertices of a ………………………………………………..

11) The number of axes of symmetry of equilateral Triangle is ……………………………………………………..

12) It is possible to draw …………………………………… passing through the two point A and B…………………

13) If the radius length of a circle M is $\frac{1}{a}$ cm , then its area = ……………………………………………………... cm^2

14) If A , B and C are three collinear points. Then the Number of circles passing through them is ……………

15) The two tangents of a circle at the two end points of Its diameter are …………………………………………..

16) M and N are two circles intersecting at A and B , then the axis of symmetry of $\overline{AB}$ is ……………………………..

17) The area of a circle with centre (2 , - 1) and passes Through the point (3 , 2) is ……………. Square units.

18) The diameter length of a circle is 6 cm , if a point B ∈ the circle M. if BM = …………………………….. Cm

19) The radius length of a circle is 5 cm. if a straight line L is at a distance 5 cm from its centre , then the straight line is ………………………………………………

20) M and N are two circles touching internally with radii r_1 and r_2 if r_1 = 6 cm and MN = 12 cm , then r_2 = ……………………………………………………....cm

21) M and N are two circles of radii 7 cm and 5 cm. if MN = 2 cm, then the two circles are ………………………..

22) The number of circles that passes through two given points is ………………………………………………

23) Number of circles that passes through non collinear three points is ……………………………………….

24) If a point A lies outside a circle M , then the length of MA …………………….…. the radius of the circle M.

25) The radius of the smallest circle passing through two points of distance 6 cm is …………………………..…..

26) If the radius length of the circle M = 5 cm. and A is a point in the plane where MA = 4 cm. , then the point A lies ……………………………….... the circle.

27) If $\overline{AB}$ is a diameter of the circle M , $\overleftrightarrow{XA}$ and $\overleftrightarrow{YB}$ are drawn to be tangents to the circle , then $\overleftrightarrow{XA}$.....$\overleftrightarrow{YB}$

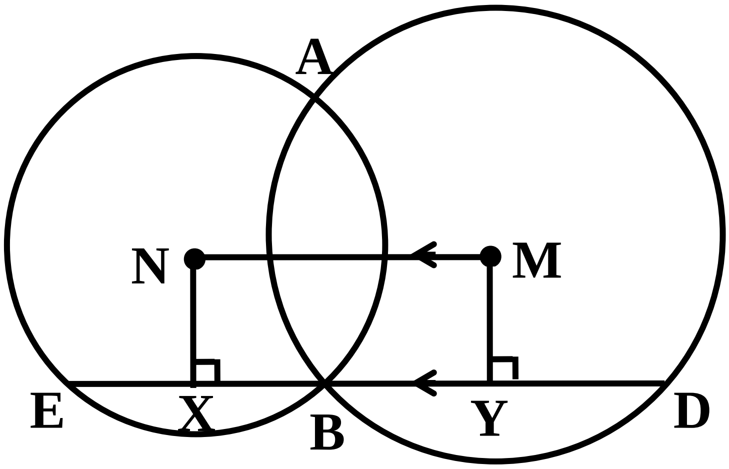
28) A circle of diameter length 10 cm. , then the straight line that touches it is at a distance ………………….. cm. from its centre. ………………………………….

29) The number of symmetry axes of the rhombus ……....

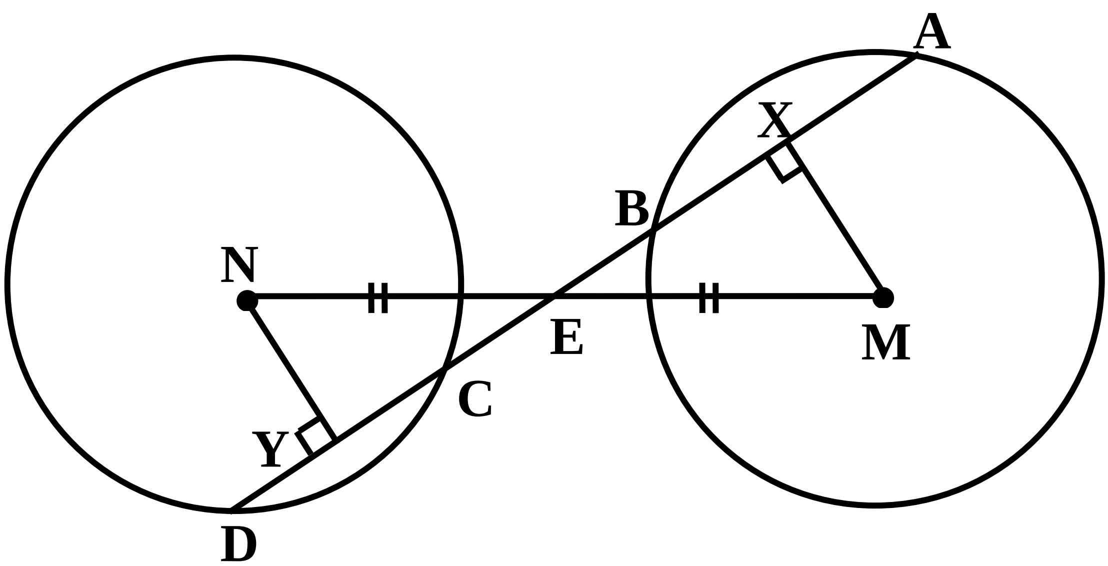
30) If M and N are two touching circles internally and the Lengths of the two radii of them are r_1 and r_2 if MN = 12 cm. , r_1 = 6 cm. then r_2 = ……………..…. cm.

[20]

M and N are two intersecting circles at A and B. draw $\overleftrightarrow{BD} \parallel \overleftrightarrow{MN}$ intersecting the two circles at D and E respectively. prove that : De = 2 MN



[21]



M and N are two distant and congruent circles. E is the midpoint of $\overline{MN}$. draw $\overleftrightarrow{AE}$ intersecting circle M at A and B intersects circle N at C and D

Prove that : 1) AB = CD

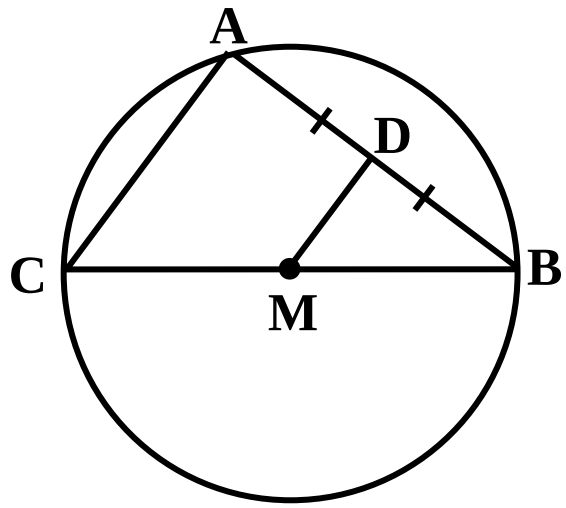
2) E is the midpoint of $\overline{AD}$

[22]

$\overline{AB}$ is a chord in a circle M , $\overline{BC}$ is a diameter on it , D is the midpoint of $\overline{AB}$

1) Prove that $\overline{MD}$ // $\overline{AC}$

2) Find m (∠A)

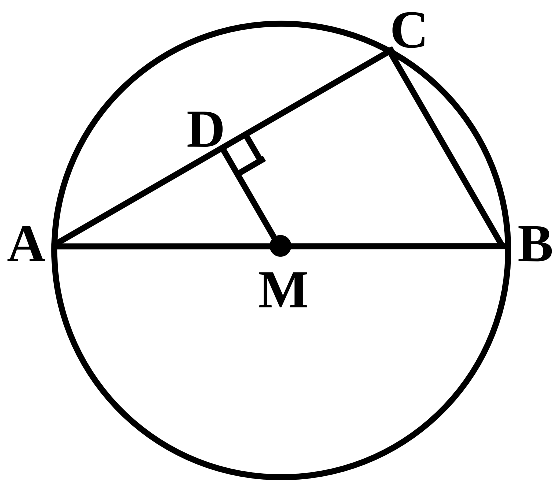


[23]

$\overline{AB}$ is a diameter in a circle M , $\overline{AC}$ is a chord on it , m(∠BAC) = 30° , draw $\overline{BC}$, $\overline{MD} \perp \overline{AC}$ to cut it at D

Prove that: 1) $\overline{MD}$ // $\overline{BC}$

2) The length of $\overline{BC}$ equals the length of the radius of the circle

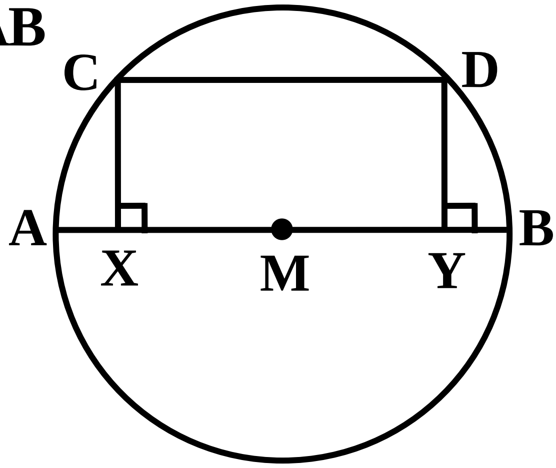


[24]

$\overline{AB}$ is a diameter in a circle M , $\overline{CD}$ is a chord on it ,

$\overline{CD} // \overline{AB}$, $\overline{CX} \perp \overline{AB}$, $\overline{DY} \perp \overline{AB}$

Prove that : AX = YB



[25] Complete:

1) The area of a circle $= 9\pi$ cm^2 , the distance between the centre and the straight line L $=$ 3 cm then L is ....

2) If the distance between the points A (0 , y) , B (4 , 0) equals 5 length unit , y $>$ 0 then y $=$ ....

3) If the point A $\in$ the circle M whose diameter length $=$ 8 cm , then MA = ... cm

4) If M and N are two circles touched internally the radius of one of them $=$ 3 cm , MN $=$ 8 cm then the radius of the other circle $=$ ....

5) The circle M with radius 5 cm touch externally the circle N , if MN $=$ 7 cm then the circumference of the circle N $=$ .... cm

[26] Choose the correct answer:

1) If M and N are two intersected circles whose radii 5 cm and 2 cm , then MN $\in$ ....

([3 , 7] ,] 3 , 7] ,] 3 , 7 [, [3 , 7 [ )

2) The origin point is the center of a circle with radius 9 cm , which point not belong to the circle?

$\big((0, 9), (0, -9), (9, 0), (9, 9) \big)$

[27]

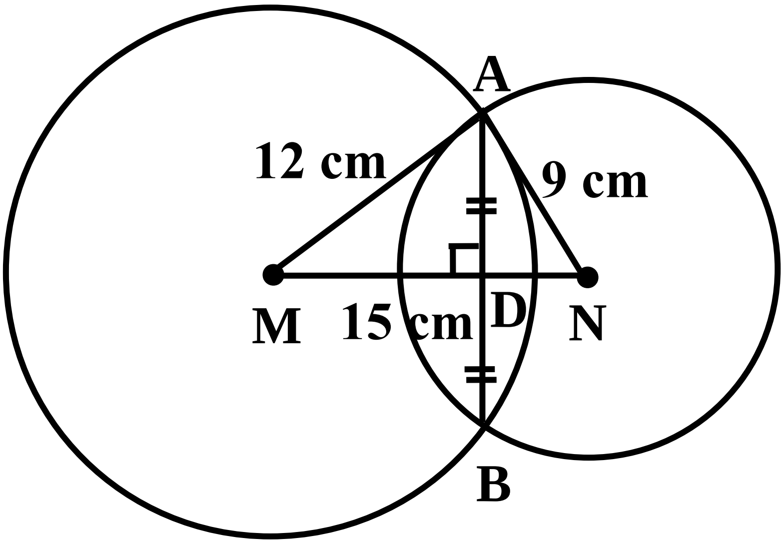
M and N are two intersecting circles at A and B ,

MA = 12 cm

, NA = 9 cm and

MN = 15 cm

Find the length of $\overline{AB}$

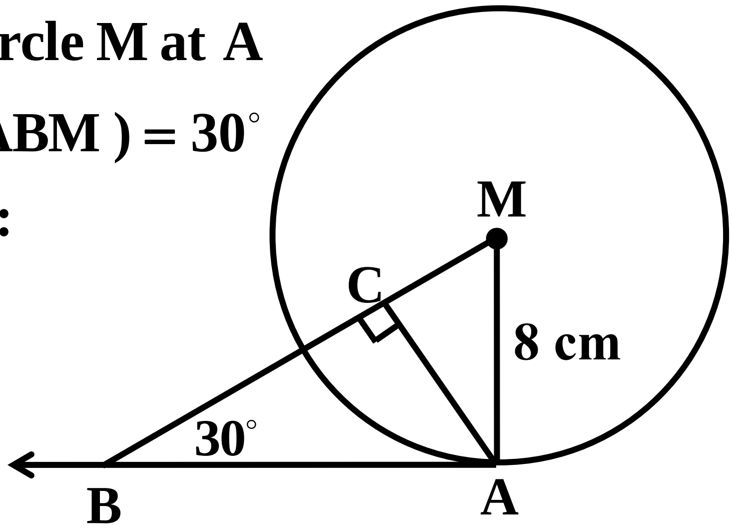


[28]

$\overrightarrow{AB}$ is a tangent to the circle M at A and MA = 8 cm , m(∠ ABM) = 30°

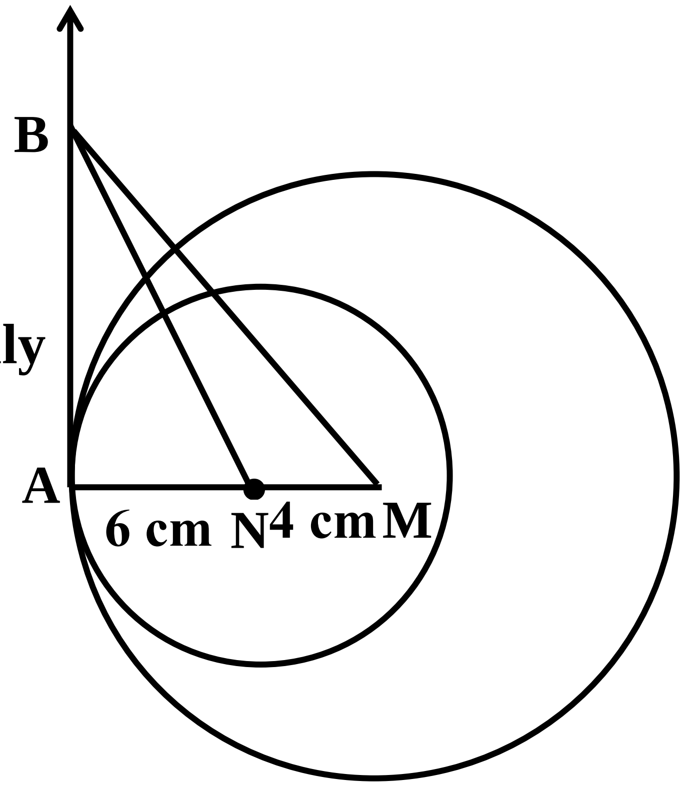
Find the length of each :

$\overline{AB}$ and $\overline{AC}$



[29]

M and N are two circles with radii length of 10 cm and 6 cm respectively and are bothy touching internally at A, $\overleftrightarrow{AB}$ is a common tangent for both at A. if the area of the triangle BMN $= 24\ cm^2$ find the length of $\overline{AB}$



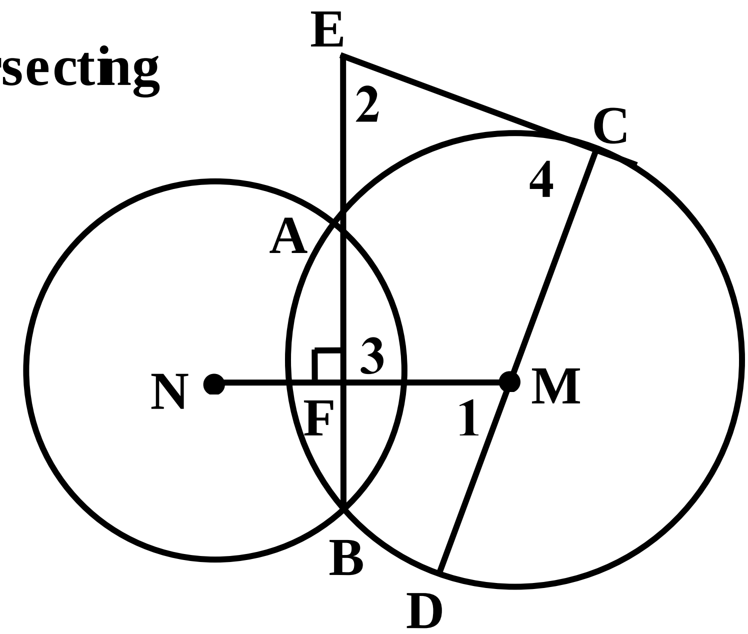
[30]

M and N are two intersecting circles at A and B, $\overline{CD}$ is a diameter in circle M and $\overline{CE}$ is a tangent to the circle M at C

$\overline{MN} \cap \overline{AB} = \{F\}$

Prove that:

$m(\angle 1) = m(\angle 2)$



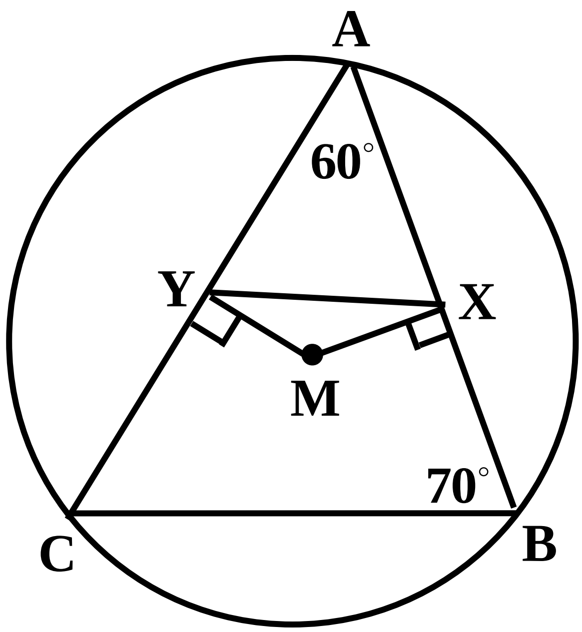
[31]

In circle M , $\overline{MX} \perp \overline{AB}$

$\overline{MY} \perp \overline{AC}$, $m(\angle A) = 60^\circ$

$m(\angle B) = 70^\circ$

Find : the measures of the angles of the triangle MXY

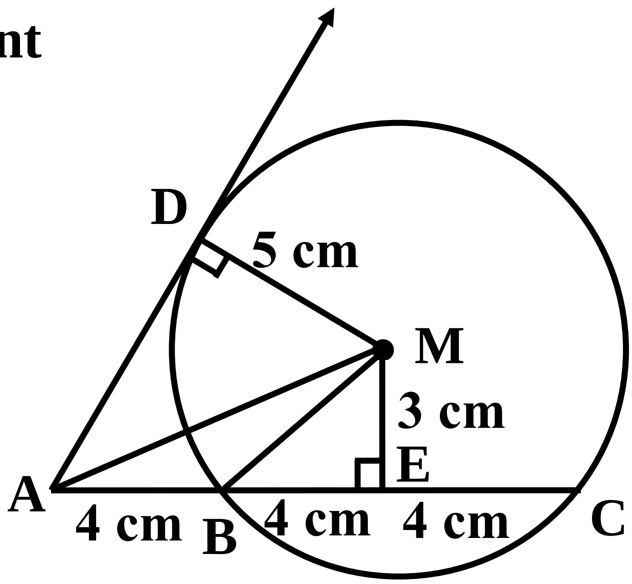


[32]

M is a circle with radius of length of 5 cm , A is a point outside the circle. $\overrightarrow{AD}$ is a tangent to circle M at D

$\overrightarrow{AB}$ intersects the circle at B and C respectively where

AB = 4 cm and AC = 12 cm.



1) Find the distance of the chord $\overline{BC}$ from the center of the circle

2) Calculate the length of $\overline{AD}$

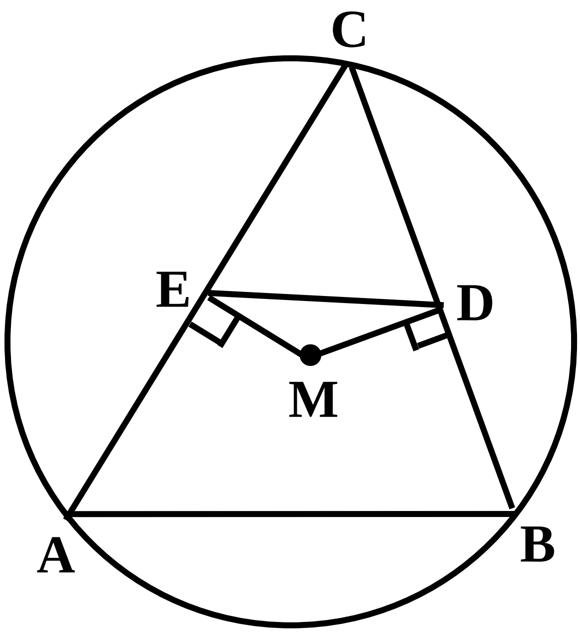
[33]

ABC is an inscribed triangle inside a circle which centre is M , $\overline{MD} \perp \overline{BC}$ and $\overline{ME} \perp \overline{AC}$, prove that:

1) $\overline{ED} // \overline{AB}$

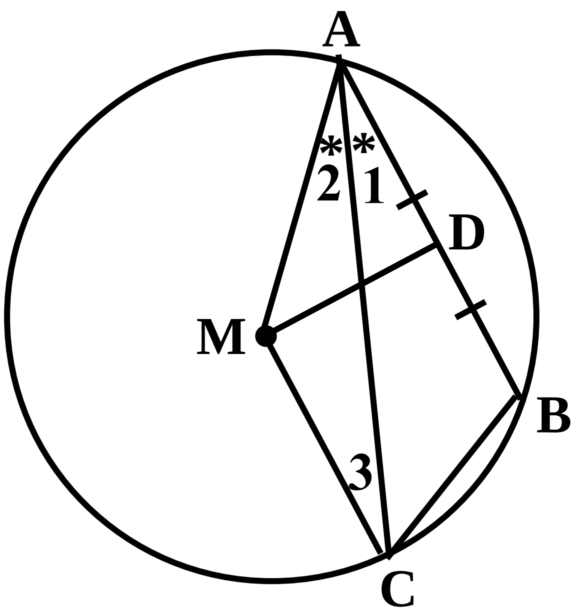
2) Perimeter of Δ CDE

$= \frac{1}{2}$ perimeter of Δ ABC



[34]

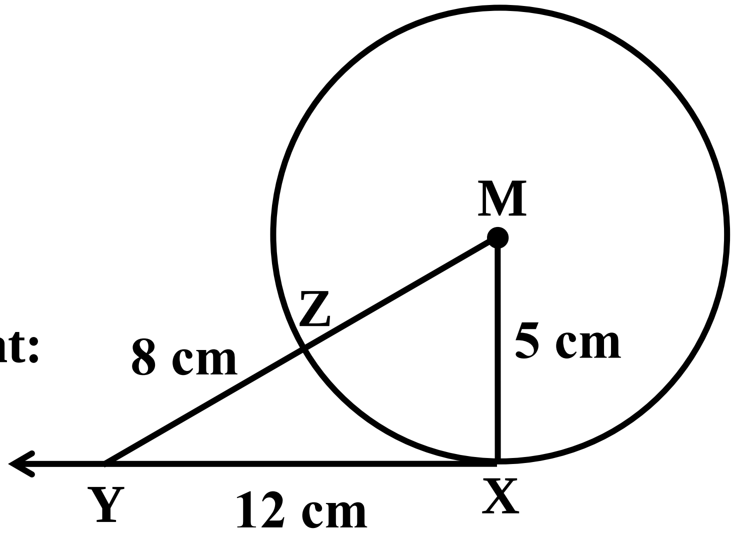
$\overline{AB}$ is a chord of circle M , $\overrightarrow{AC}$ bisects $\angle BAM$ andintersects circle M at C if D is the midpoint of $\overline{AB}$prove that: $\overline{DM} \perp \overline{CM}$



[35]

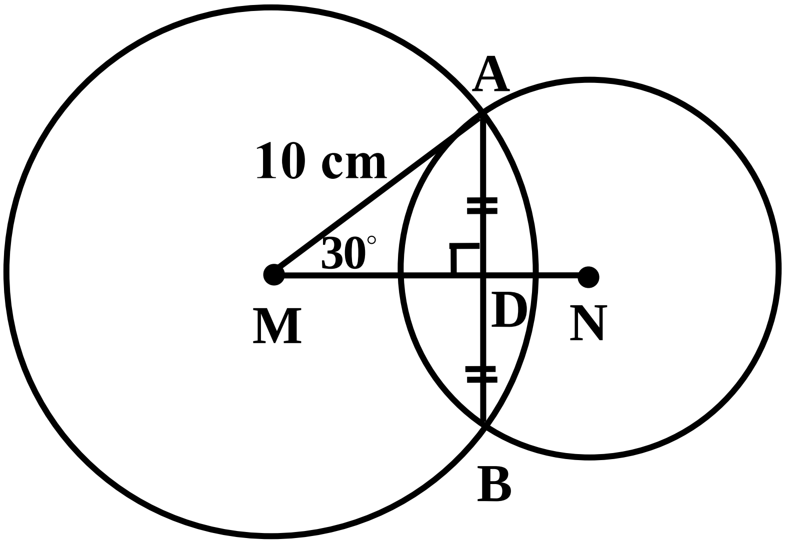
M is a circle with radius length 5 cm $XY = 12$ cm , $\overline{MY} \cap$ circle M $= \{Z\}$ and $ZY = 8$ cm. prove that:

$\overleftrightarrow{XY}$ is a tangent to the circle M at X



[36]

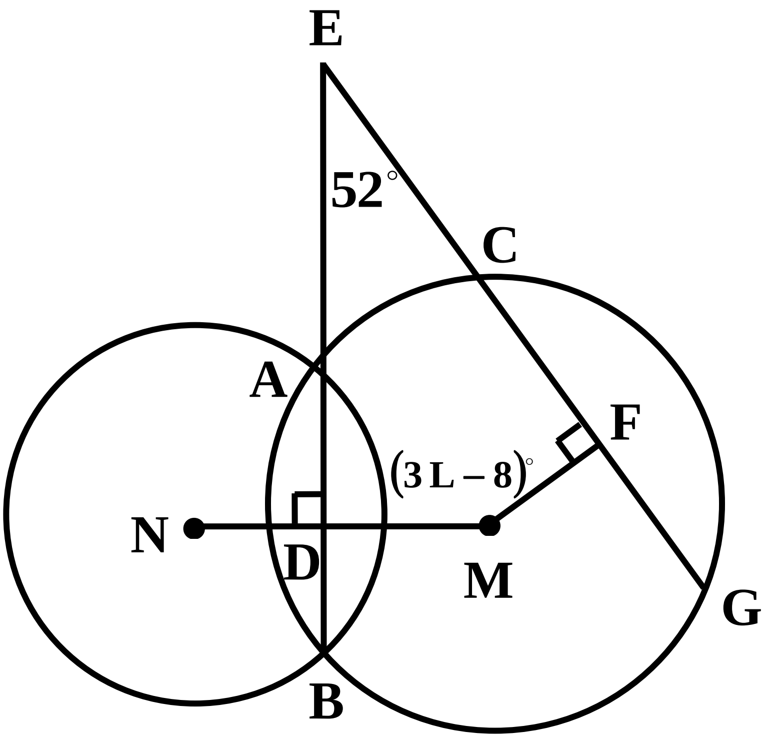
In the opposite figure find the length of $\overline{AB}$



[37]

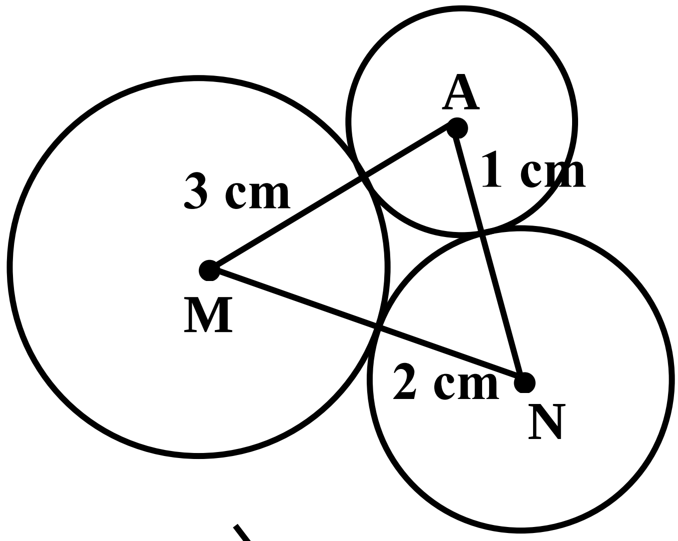
In the opposite figure :

Find the value of L



[38]

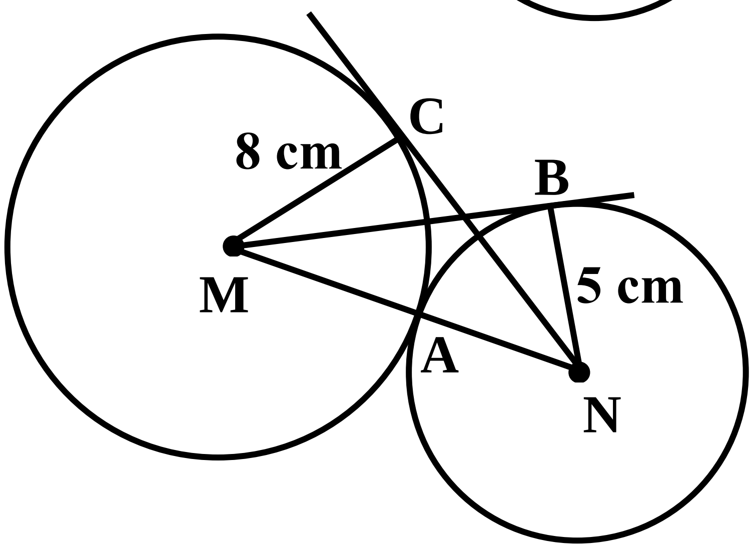
Find m (∠A)



[39]

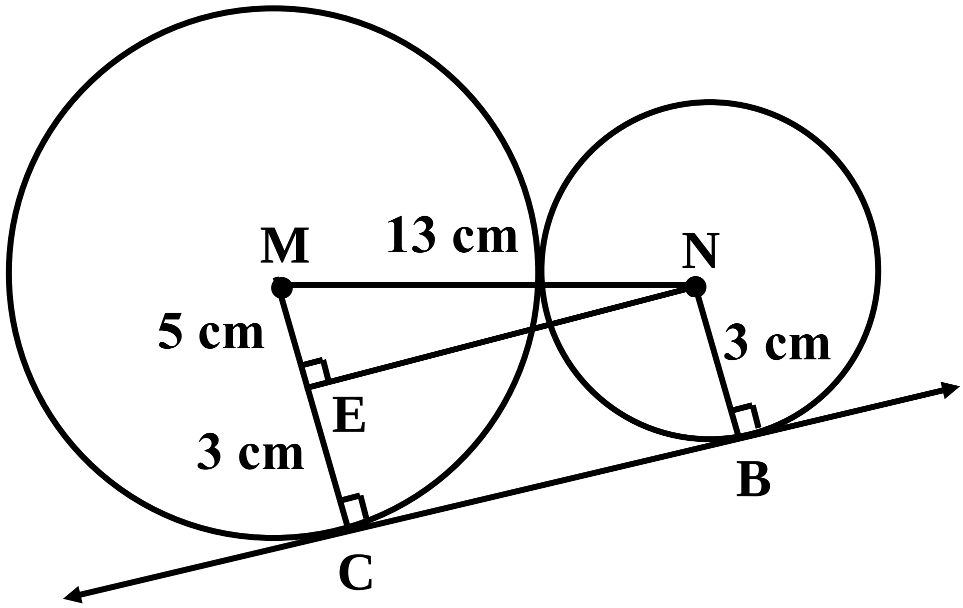
Find the length of :

$\overline{MB}$, $\overline{NC}$



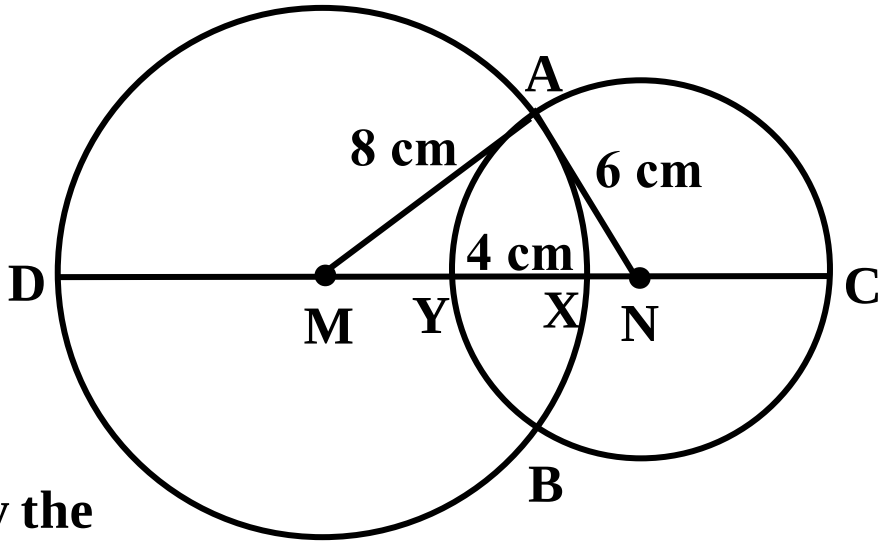
[40]

If the length of the radius M is 8 cm and the length of the radius of the circle N is 3 cm then find the length of $\overline{BC}$



[41]

M and N are two intersecting circles at A and B, the two radii length are 8 cm and 6 cm respectively and X Y = 4 cm. study the figure then answer the following questions:



1) Complete: i) YM = ... cm   ii) CX = ... cm

iii) CD = ... cm

2) Is the perimeter of the triangle ANM = the length of $\overline{CD}$? Explain the answer.

3) What is the measure of ∠NAM.

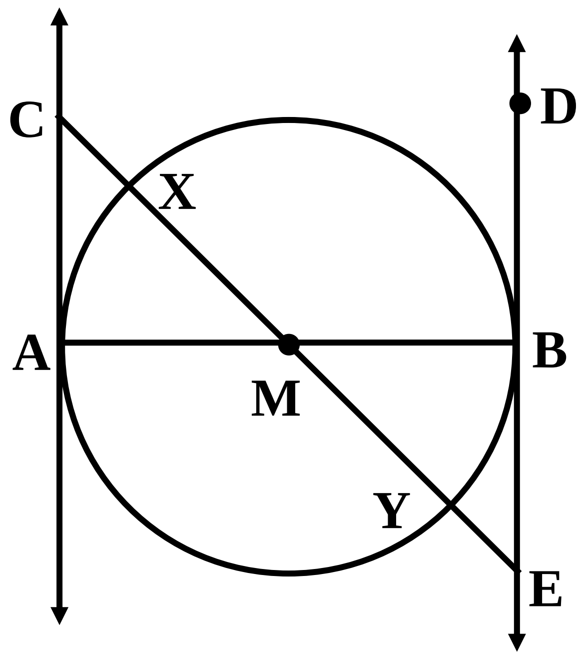
4) find the area of the triangle NAM.

5) What is the length of the common chord $\overline{AB}$

[42]

$\overline{AB}$ is a diameter in circle M

$\overleftrightarrow{AC}$ and $\overleftrightarrow{BD}$ are two tangents of the circle M, $\overrightarrow{CM}$ intersects the circle M at X and Y and intersects $\overleftrightarrow{BD}$ at E. prove that: CX = YE

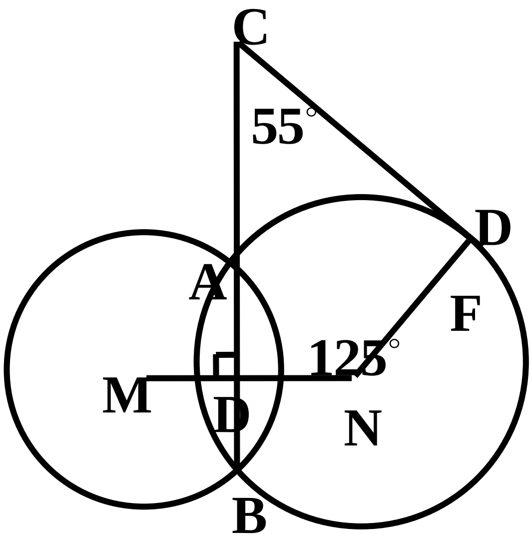


[43]

M and N are two intersecting circles at A and B , C and $D \in \overrightarrow{BA}$, $D \in$ the circle at N and

$m(\angle MND) = 125^\circ$

$m(\angle BCD) = 55^\circ$



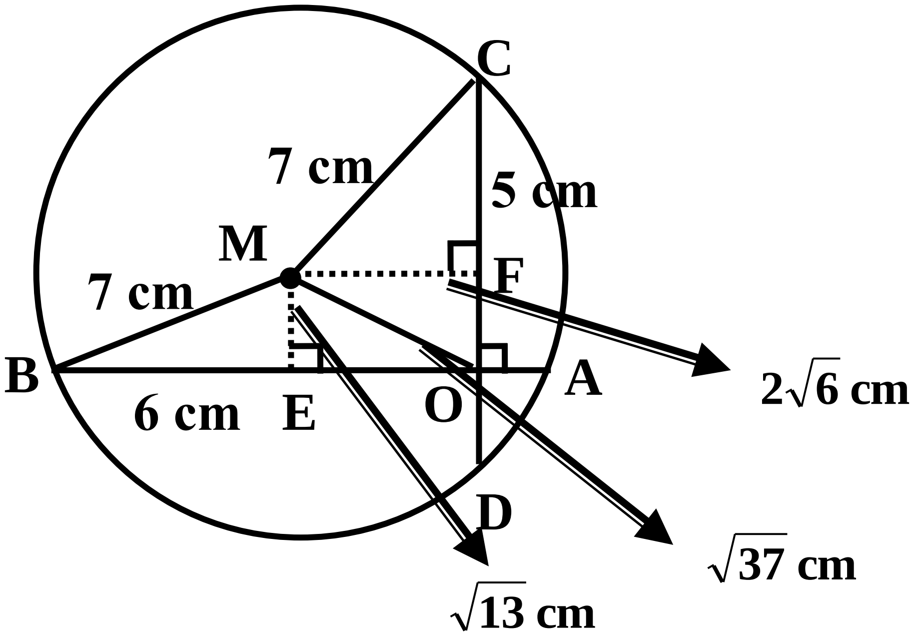
Prove that $\overleftrightarrow{CD}$ is a tangent to the circle N at D

[44]

Circle M has a radius length 7 cm , $\overline{AB}$ and $\overline{CD}$ are two perpendicular and intersecting chords at point O. if

AB = 12 cm and CD = 10 cm find the length of $\overline{MO}$

[45] Draw three circles touching externally , two – by two their radii length are 2 cm , 3 cm and 4 cm



[46]

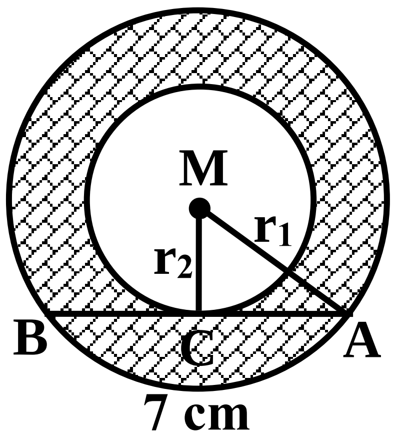
Draw the triangle ABC in which AB = 6 cm , $m(\angle A) = 40^\circ$ and the radius length of the circumscribed circle about the triangle ABC equals 5 cm. If D is the mid - point of $\overline{AB}$, then calculate the length of $\overline{MD}$ where M is the centre of the circumscribed circle about the triangle

[47]

Find the equation of the straight line perpendicular to $\overline{AB}$ from its midpoint C where A (1 , 3) and B (3 , 5)

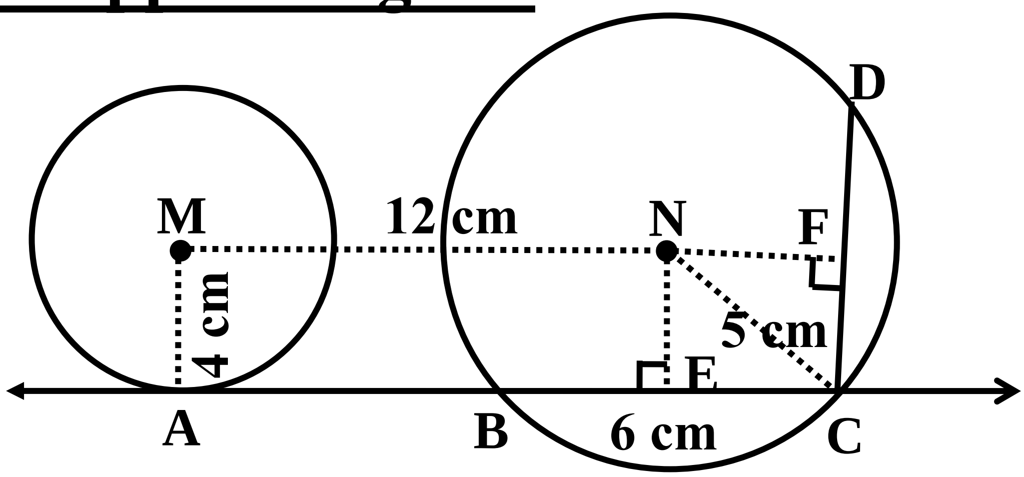
[48*] In the opposite figure:

Two concentric circles at M , the radius length of the great circle is r_1 and the radius length of the small circle is r_2 , $\overline{AB}$ is a chord in the great circle and touches the small circle at C ,



AB = 7 cm. find the area of the shaded region ($\pi = \frac{22}{7}$)

[49*] In the opposite figure:



M and N are two circles with radii of lengths 4 cm and 5 cm

$\overrightarrow{AC}$ touches circle M at A and cuts circle N at B and C where BC = 6 cm and MN = 12 cm.

1) Prove that : the quadrilateral MACN is a trapezium and find its area

2) If CD = CB find the distance between N and $\overline{CD}$

[50*] In the opposite figure:

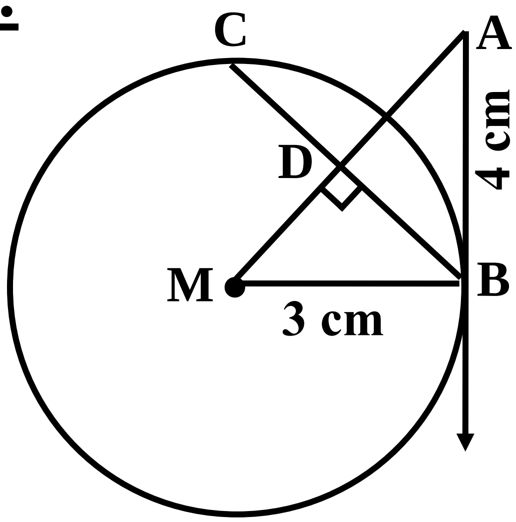
M is a circle , $\overline{BC}$ is a chord in it

$\overrightarrow{BA}$ is a tangent at B.

$\overrightarrow{AM} \perp \overline{BC}$, $\overrightarrow{MA} \cap \overline{BC} = \{D\}$

MB = 3 cm and AB = 4 cm.

Find the length of $\overline{BC}$



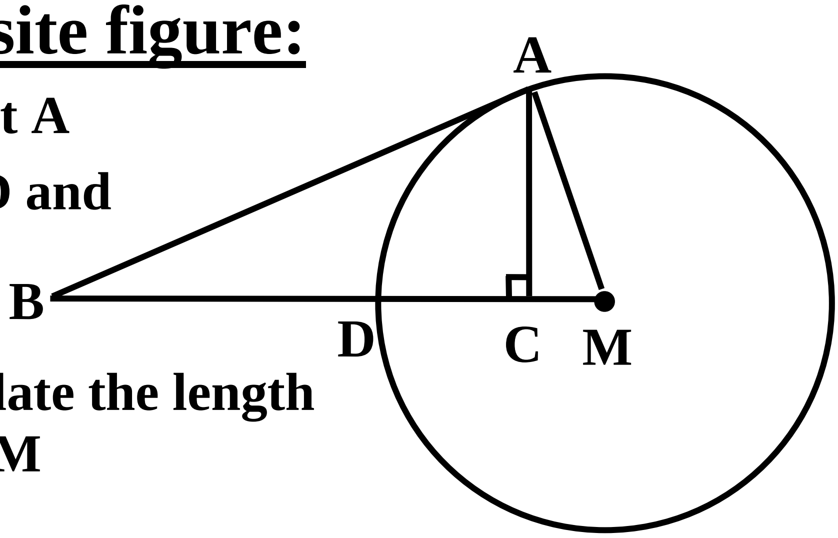
[51*] In the opposite figure:

$\overline{AB}$ touches circle M at A

$\overline{MB}$ cuts circle M at D and

$\overline{AC} \perp \overline{MB}$ cutting it at C if MC = 3.6.

and BD = 4 cm , calculate the length of the radius of circle M



[52*]

Using geometric tools , draw $\overline{AB}$ where AB = 8 cm. and draw a circle passing through A and B where its radius length = 5 cm (Don ' t remove the arcs)

[53*]

Using geometric instruments draw Δ ABC in which AB = 3 cm , BC = 4 cm and AC = 5 cm . then draw the circle which passes through the points A , B , C

[54] Choose:

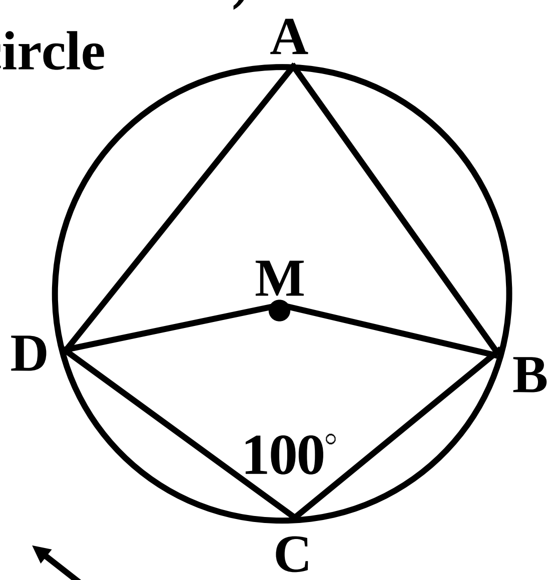
1) The inscribed angle drawn in a semi circle ....

(acute , right , obtuse , straight angle)

2) The shape that the circle not passing through its vertices is ....

(triangle , square , rectangle , rhombus)

3) In the opposite figure : M is a circle ABCD is a ciclic quadrilateral , m (∠ C) = 100° then :



i) m(∠A) = ...°

[80 , 100 , 120 , 160]

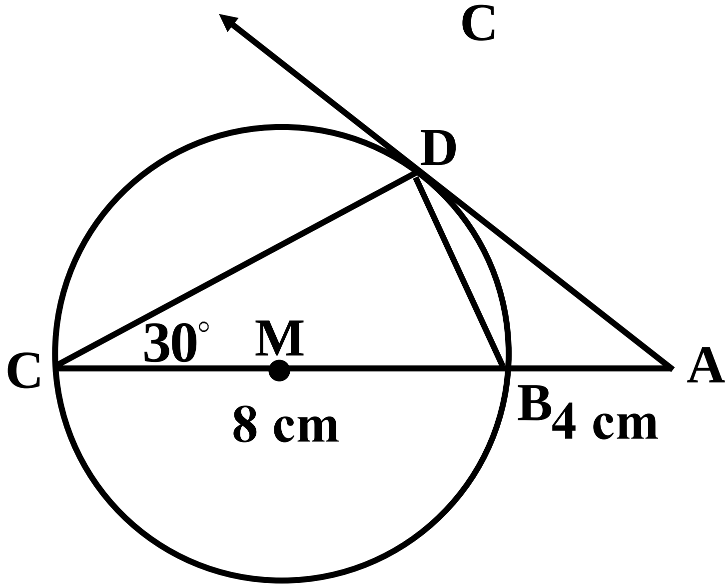
ii) m (BCD) = ...°

[40 , 80 , 160 , 200]

4) In the opposite figure :

$\overrightarrow{AD}$ is a tangent in the circle M at D

, $\overrightarrow{AM}$ ∩ circle M



$= \{ B , C \}$, AB = 4 cm ,

BC = 8 cm , m ($\angle$ C) = 30°

, then

i) m ($\angle$ ADB) = ...° [30 , 60 , 90 , 120]

ii) AD = ... cm $\left[4 , 4\sqrt{3}, 8 , 8\sqrt{3} \right]$

[55] Complete:

1) The two tangents drawn from a point outside the circle are ....

2) Measure of the inscribed angle equal .... measaure of the central angle subtended by the same arc

3) A circle its perimeter = 44 cm then the length of the arc of measure 90° in the circle = ... cm

4) Measure of the exterior angle at any vertex of a cyclic quadrilateral .... measure of opposite adjacen inerior angle

5) In the opposite figure:

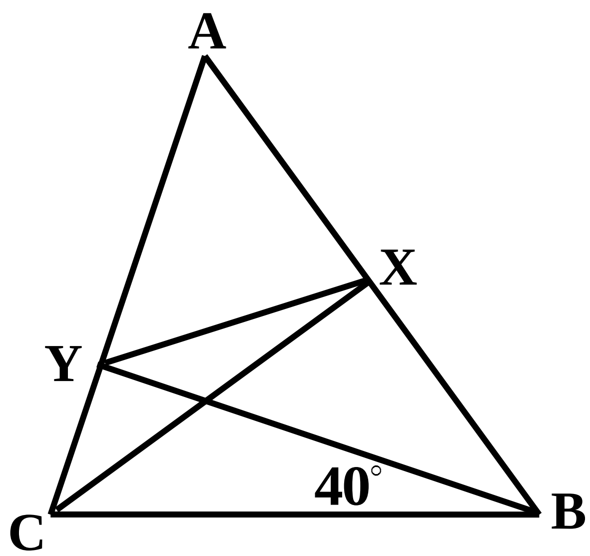
Δ ABC where $\overline{CX} \perp \overline{AB}$

, $\overline{BY} \perp \overline{AC}$, m($\angle$YBC) = 40°

then

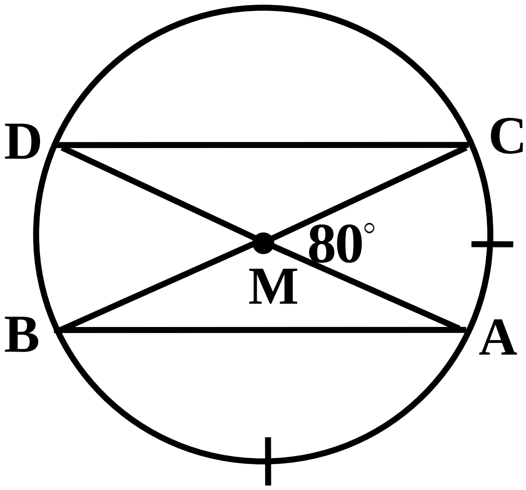
i) The figure .... is a cyclic quadrilateral.

ii) m($\angle$CXY) = ...°



[56] a) In the opposite figure:

M is a circle , $\overline{AB}$, $\overline{CD}$ are two parallel chords , m (AC) = m(AB) , find :

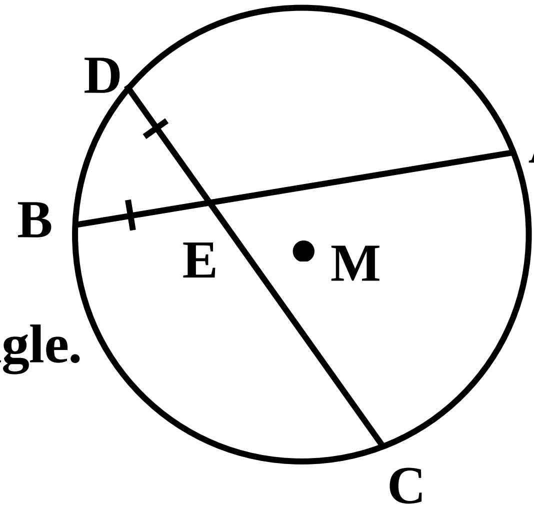


i) m(∠MAB) ii) m (CD)

b) In the opposite figure:

$\overline{AB}$, $\overline{CD}$ in the circle M

, $\overline{AB} \cap \overline{CD} = \{ E \}$,



ED = EB prove that:

Δ ACE is an isosceles triangle.

[57] a) Prove that if the quadrilateral is a cyclic each two opposite angles are supplementary

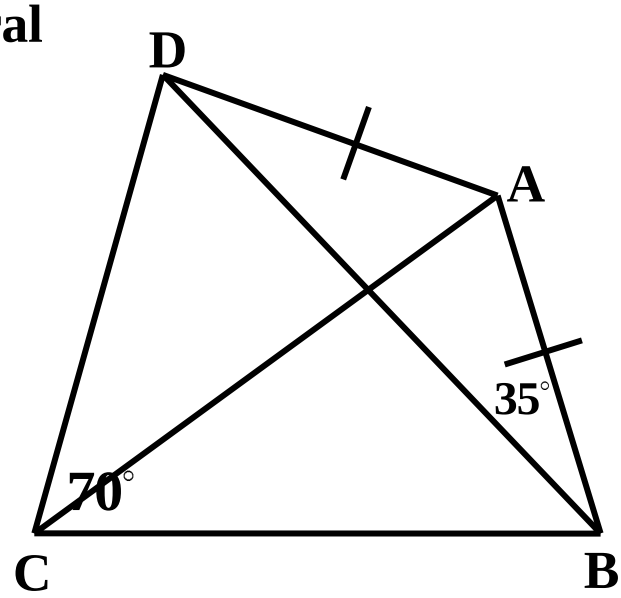
b) ABCD is a quadrilateral

where AB = AD

, m(∠ABD) = 35°

, m(∠BCD) = 70°

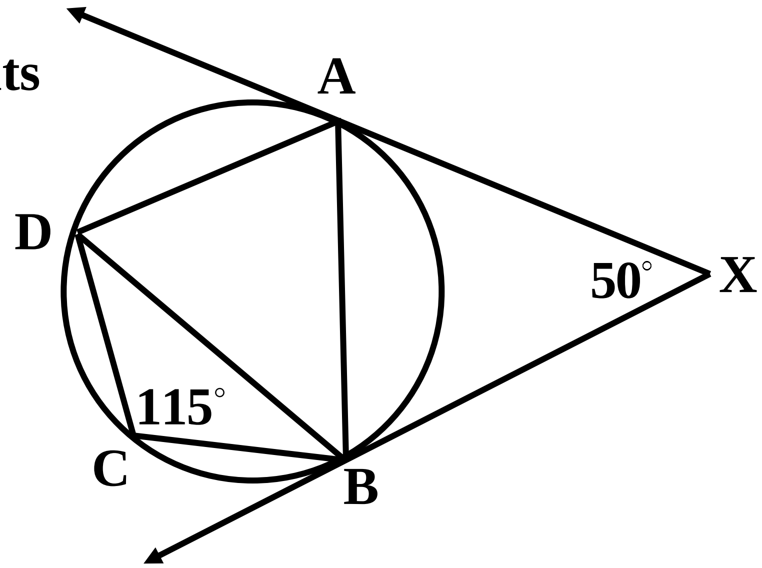
, Prove that:



i) ABCD is a cyclic quadrilateral

ii) $\overrightarrow{CA}$ bisects $\angle BCD$

[58] In the opposite figure:



$\overrightarrow{XA}$, $\overrightarrow{XB}$ are two tangents at A , B , m($\angle$AXB) = 50°

, m($\angle$DCB) = 115°

, prove that :

i) $\overrightarrow{AB}$ bisects $(\angle DAX)$

ii) $\overrightarrow{AD}$ // $\overrightarrow{XB}$

[59] Choose:

1) The central angle of measure 90° opposite to an arc of length = ... circumference of the circle. $\left(\frac{1}{6}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}\right)$

2) Measure of arc which represent half the measure of the circle = ...° (90, 180, 270, 360)

3) In the cyclic quadrilateral each two opposite angles are ....

(equal , supplementary , compplementary , corresponding)

4) Measure of the exterior angle at any vertex of a cyclic quadrilateral .... measure of opposite adjacen inerior angle $(> , < , = , \neq)$

5) Number of common tangents drawn to distant circles = ... (4 , 3 , 2 , infinite)

6) $\overline{AB}$, $\overline{AC}$ are two tangents at B and C of a circle of radius length 3 cm , if AB = 5 cm then AC = ... cm (2 , 3 , 5 , 8)

[60] Complete:

1) Measure of the inscribed angle drawn in a semi circle = ...°

2) The two parallel chords subtended two arcs .... in measure

3) If two opposite angles in a quadrilateral are supplementary then this quadrilateral is ....

4) If two chords are intersecting inside the circle then the measure of intersection angle equals .... sum of measures of the two oppsite arcs to this angle.

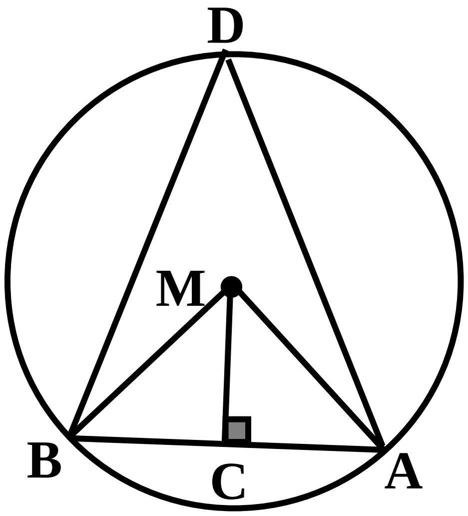
5) The two tangents at the ends of a diameter in a circle are ....

6) Measure of the angle of tangency equals .... measure of central angle subtended by the same arc.

[61] a) In the opposite figure:

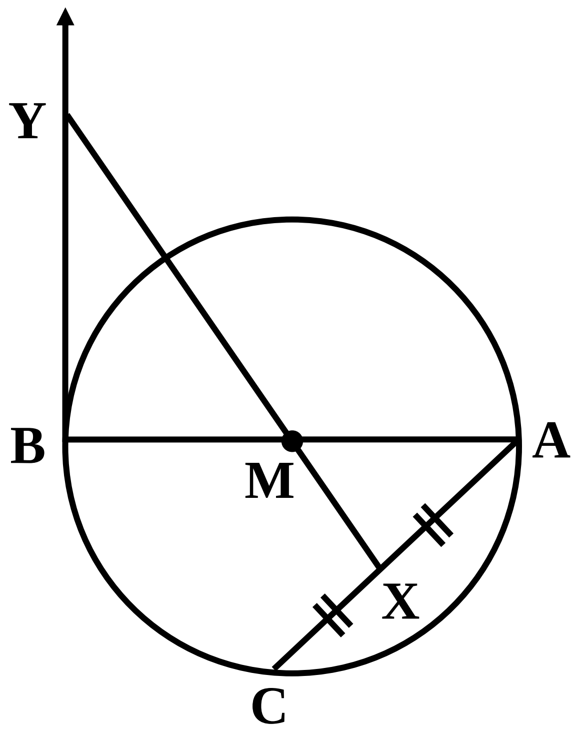
$\overline{AB}$ is a chord in the circle M , $\overline{MC} \perp \overline{AB}$

prove that m (∠ AMC) = m (∠ ADB)



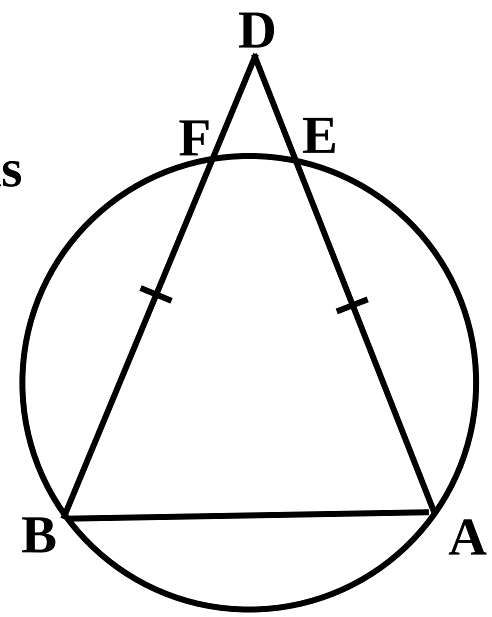
b) In the opposite figure:

$\overline{AB}$ is a diameter in the circle M , X is a midpoint of $\overline{AC}$, $\overrightarrow{XM}$ intersect the tangent of the circle at B in Y , prove that AXBY is a cyclic quadrilateral

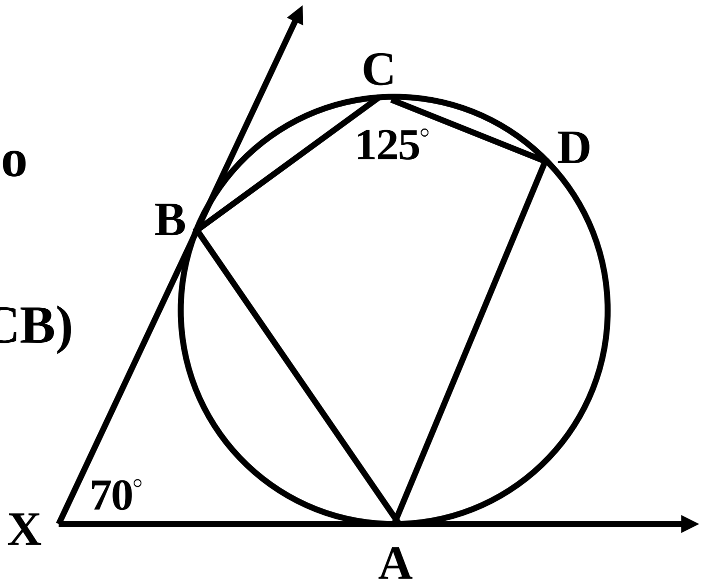


[62] a) In the opposite figure:

$\overline{AE}$, $\overline{BF}$ are two equal chords in the circle , $\overrightarrow{AE} \cap \overrightarrow{BF} = \{D\}$ prove that ED = FD



b) In the opposite figure : $\overrightarrow{XA}$, $\overrightarrow{XB}$ are two tangents at A , B , $m(\angle AXB) = 70^\circ$, $m(\angle DCB) = 125^\circ$ prove that : $\overrightarrow{AB}$ bisect $(\angle DAX)$



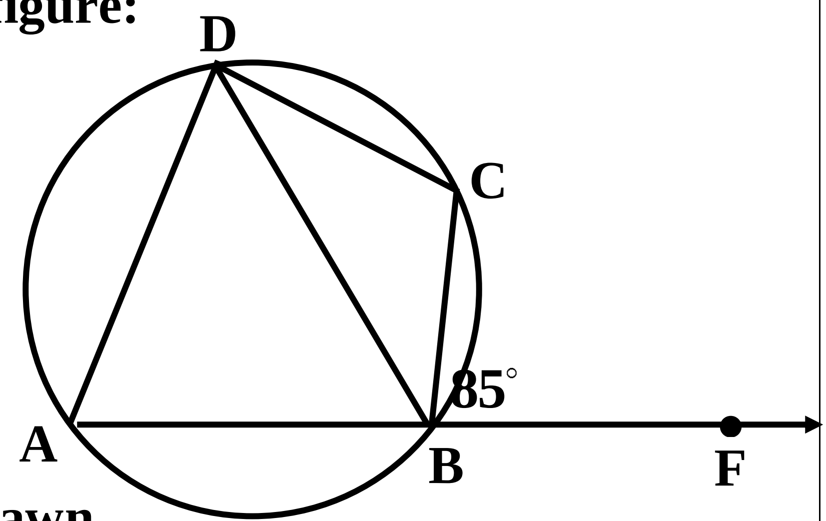
[63] a) In the opposite figure:

F $\in$ $\overrightarrow{AB}$, F $\notin$ $\overline{AB}$

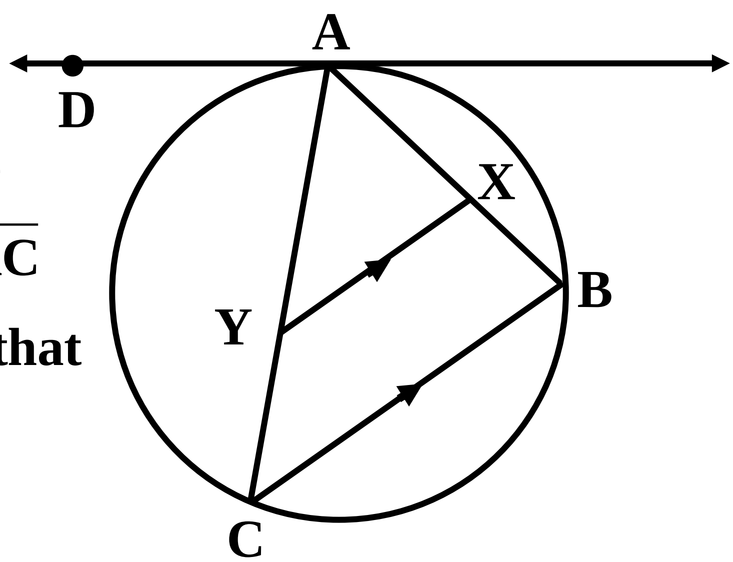
, m (AB) = 110°

, m ($\angle$ CBF) = 85°

Find m ($\angle$ BDC)



b) ABC is a triangle drawn inside the circle , $\overleftrightarrow{AD}$ is a tangent to the circle at A , X $\in$ $\overline{AB}$, Y $\in$ $\overline{AC}$ where $\overline{XY}$ // $\overline{BC}$ prove that $\overleftrightarrow{AD}$ is a tangent to the circle passing through A , X , and Y



[64] Choose:

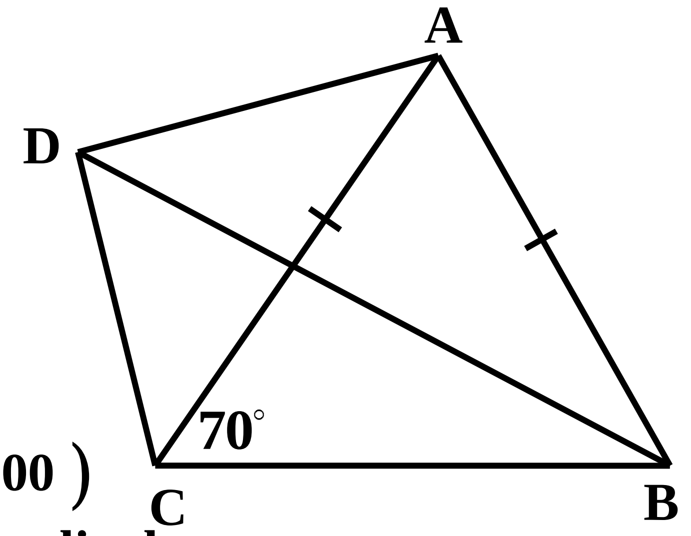
1) Number of drawn tangents from a point outside a circle = ... (1 , 2 , 3 , infinite)

2) The length of the arc opposite to the inscribed angle of measure 45° in a circle ....

$\left(\pi r , \frac{1}{4}\pi r , \frac{1}{8}\pi r , \frac{1}{2}\pi r \right)$

3) In the opposite figure:

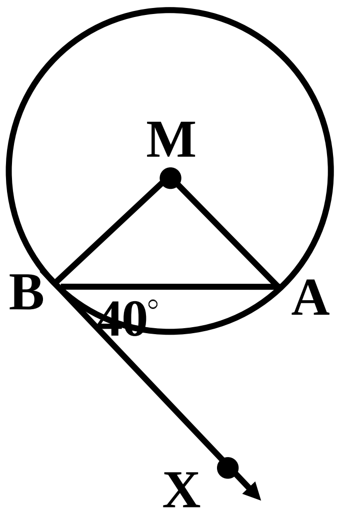
ABCD is a cyclic quadrilateral , AB = AC , m ($\angle$ ACB) = 70° then m ($\angle$ BDC) = ...$^\circ$ (40 , 70 , 140 , 100)



4) If the quadrilateral is a cyclic then every two opposite angles are ....

(equal in measure , commutative , compplementary , supplementary)

5) In the opposite figure circle M , $\overrightarrow{BX}$ is a tangent of a circle at B , m ($\angle$XBA) = 40° then m ($\angle$ ABM) = ...$^\circ$ (80 , 40 , 20 , 100)

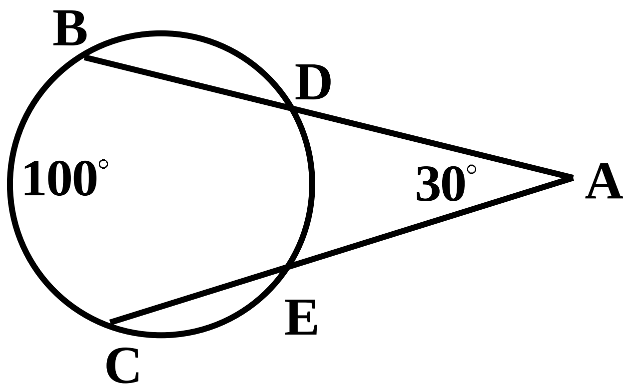


6) In the opposite figure :

m ($\angle$ A) = 30°, m($\overset{\frown}{BC}$) = 100°

, then m($\overset{\frown}{DE}$) = ...°

(30 , 40 , 130 , 70)



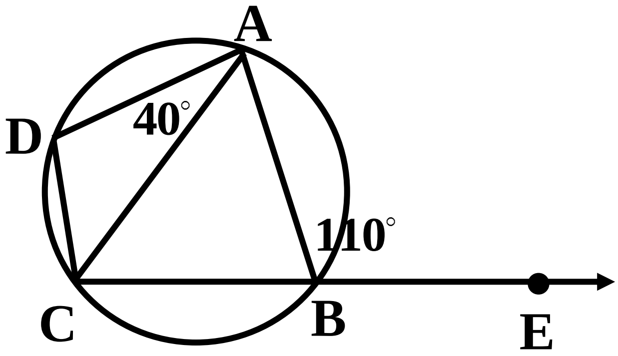
[65] Complete:

1) In the opposite figure :

m($\angle$ABE) = 110°

, m($\angle$DAC) = 40°

then m($\angle$DCA) = ...°



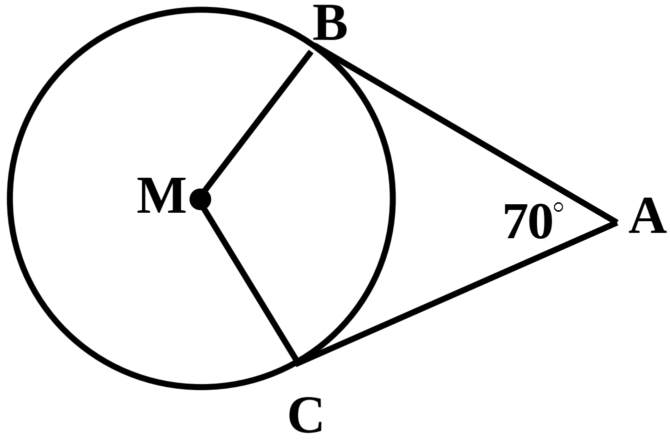
2) In the opposite figure :

$\overline{AB}$, $\overline{AC}$ are two tangents

to the circle M ,

m($\angle$A) = 70°

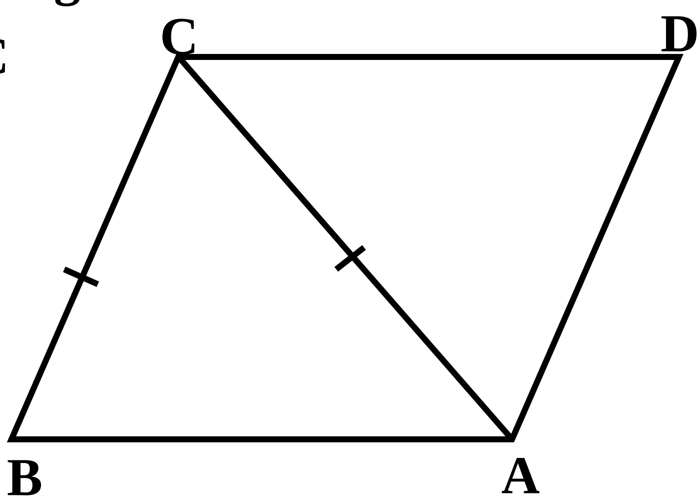
then m($\overset{\frown}{BC}$) = ...°



[66] a) In the opposite figure:

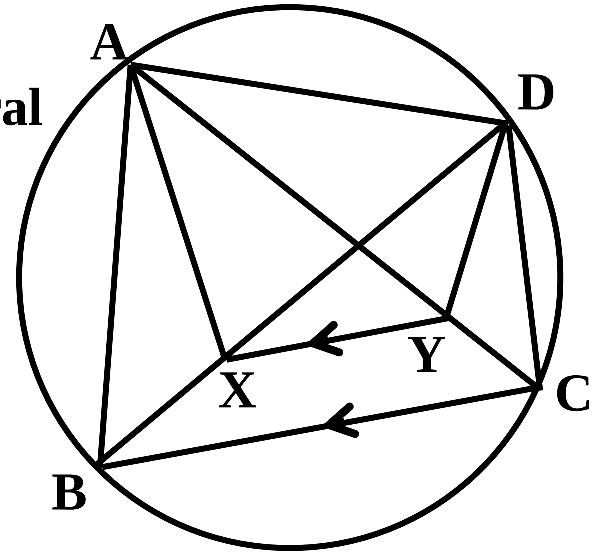
ABCD is a parallelogram , AC = BC

, prove that: $\overleftrightarrow{DC}$ is a tangent for circumcircle of Δ ABC



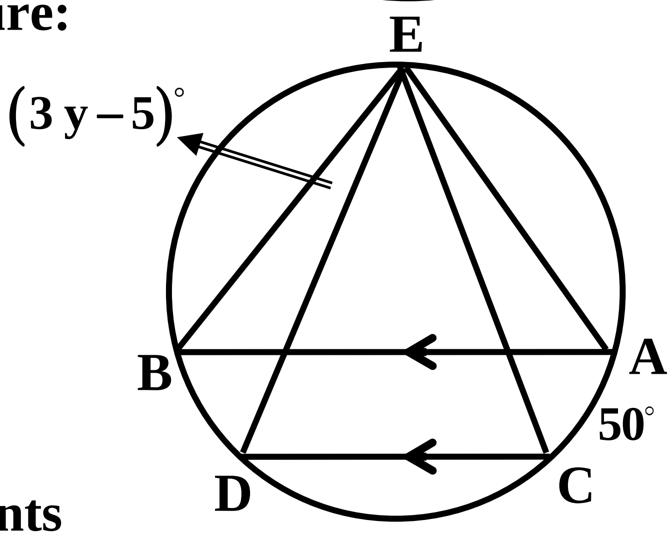
b) In the opposite figure:

ABCD is a cyclic quadrilateral drawn inside the circle , $\overline{XY} // \overline{BC}$. prove that: AXYD is a cyclic quadrilateral



[67] a) In the opposite figure:

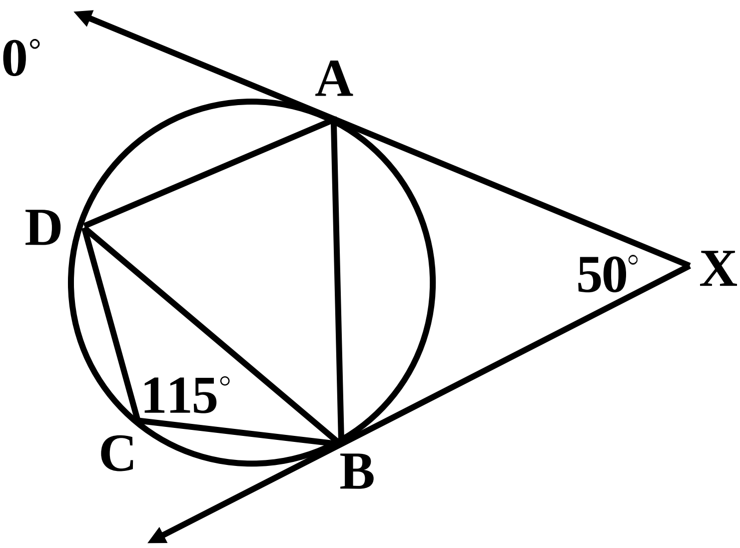
$\overline{AB} // \overline{CD}$, m(AC) = 50° , m(∠BED) = $(3y - 5)^\circ$ then find the value of y by degree.



b) $\overrightarrow{XA}$, $\overrightarrow{XB}$ are two tangents at A , B , m(∠AXB) = 50° , m(∠DCB) = 115° , prove that :

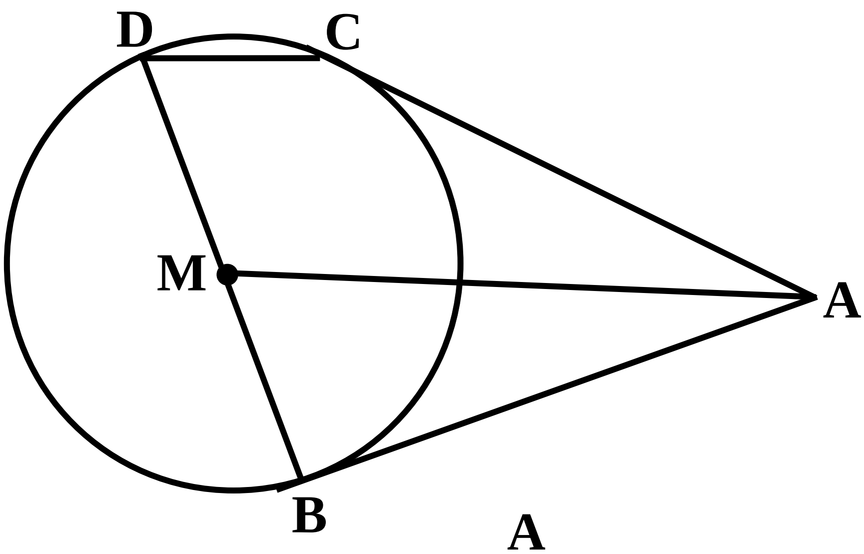
i) $\overrightarrow{AB}$ bisects (∠DAX)

ii) BA = BD

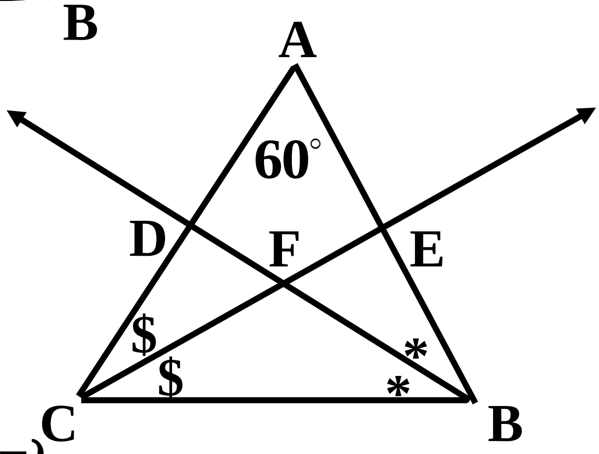


[68] a) In the opposite figure:

$\overline{AB}$, $\overline{AC}$ are two tangents , $\overline{BD}$ is a diameter in the circle M. prove that: $\overline{CD} \parallel \overline{AM}$

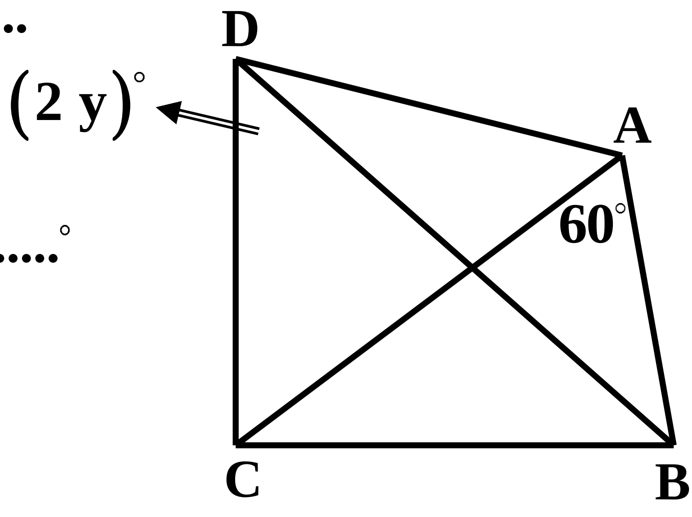


b) ABC is a triangle , $m(\angle A) = 60^\circ$ draw $\overrightarrow{BD}$ bisect $\angle B$ cut $\overline{AC}$ at D , draw $\overrightarrow{CE}$ bisect $\angle C$ cut $\overline{AB}$ at E , $\overrightarrow{BD} \cap \overrightarrow{CE} = \{F\}$ prove that AEFD is a cyclic quadrilateral



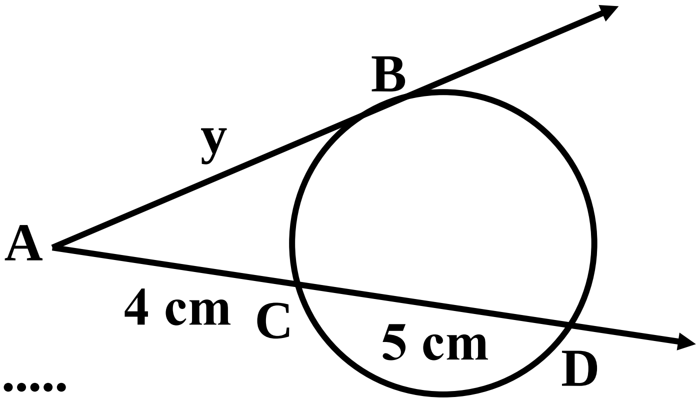
[69] Complete:

1) Measure of inscribed angle drawn in a semi circle = ... °
2) The trapezium can be cyclic quadrilateral if ....
3) The two tangents drawn from a point outside the circle are ....
4) In the opposite figure: if ABCD is a cyclic quadrilateral then y = ...°



5) In the opposite figure:

the value of y = ... cm



6) The two parallel chords subtended two arcs ....

[70] Choose:

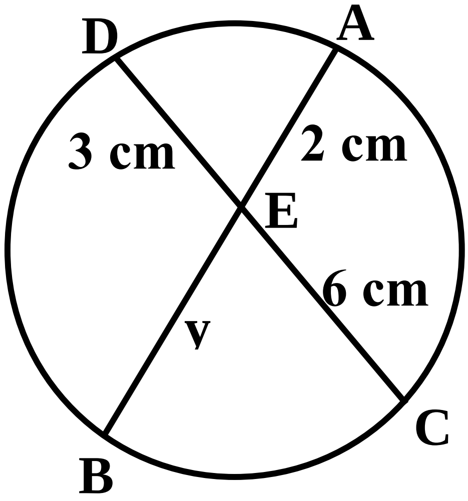
1) Measure of the exterior angle at any vertex of a cyclic quadrilateral .... measure of opposite adjacen inerior angle $(>, <, =, \neq)$

2) Number of common tangents drawn to distant circles = ... (4 , 3 , 2 , infinite)

3) In the opposite figure:

the value of y = ... cm

(9 , 4 , 12 , 18)



4) The length of the arc which represent $\frac{1}{4}$ circumference of the circle

$= \left(2\pi r, \pi r, \frac{1}{2}\pi r, \frac{1}{4}\pi r\right)$

5) In the cyclic quadrilateral the sum of each two opposite angles = ...$^\circ$ (360 , 180 , 90 , 270)

6) Measure of the angle of tangency equals

.... measure of the central angle

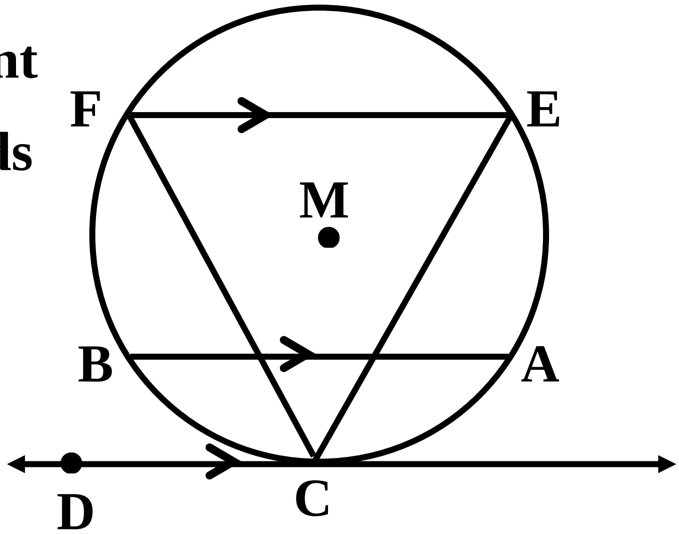
subtended by the same arc $\left(\frac{1}{2}, \frac{1}{4}, \frac{1}{3}, \text{twice}\right)$

[71] a) In the opposite figure:

M is a circle , $\overleftrightarrow{CD}$ is a tangent at C , $\overline{AB}$, $\overline{EF}$ are two chords in the circle where:

$\overline{AB} \parallel \overline{EF} \parallel \overleftrightarrow{CD}$

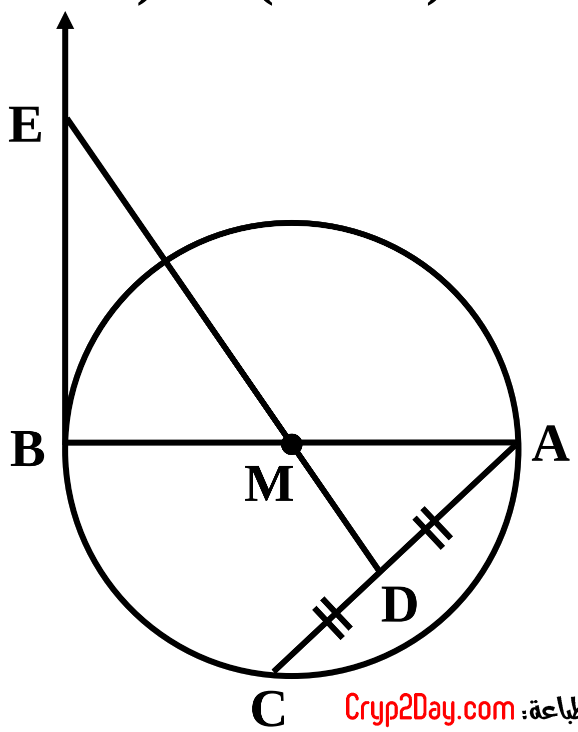
Prove that : CE = CF



b) $\overline{AB}$ is a diameter in the circle M. D is the midpoint of $\overline{AC}$ and $\overrightarrow{BE}$ is a tangent to the circle to cut $\overrightarrow{DM}$ at E

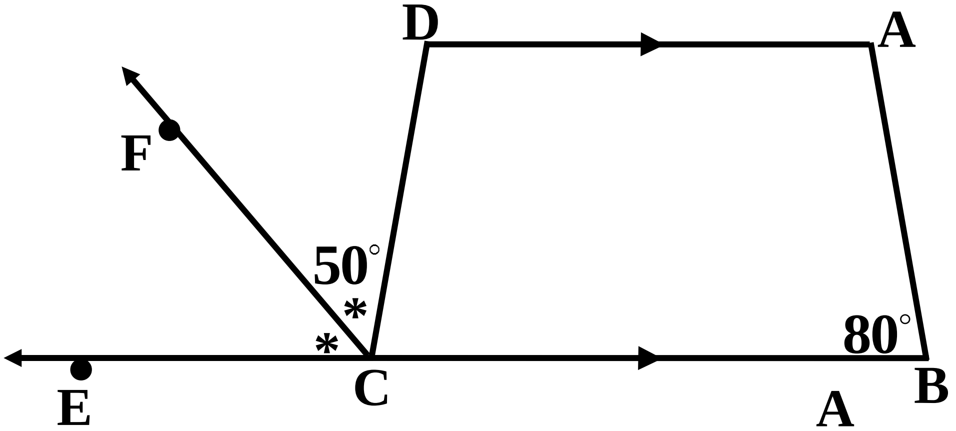
Prove that: 1) the figure ADBE is a cyclic quadrilateral

2) $m(\angle CMB) = m(\angle BED)$

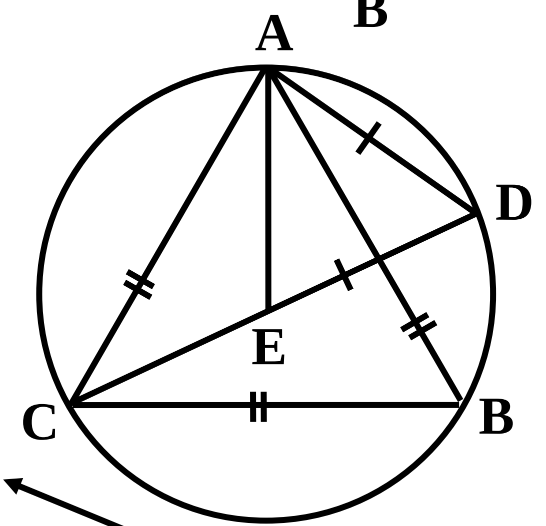


[72] a) In the opposite figure:

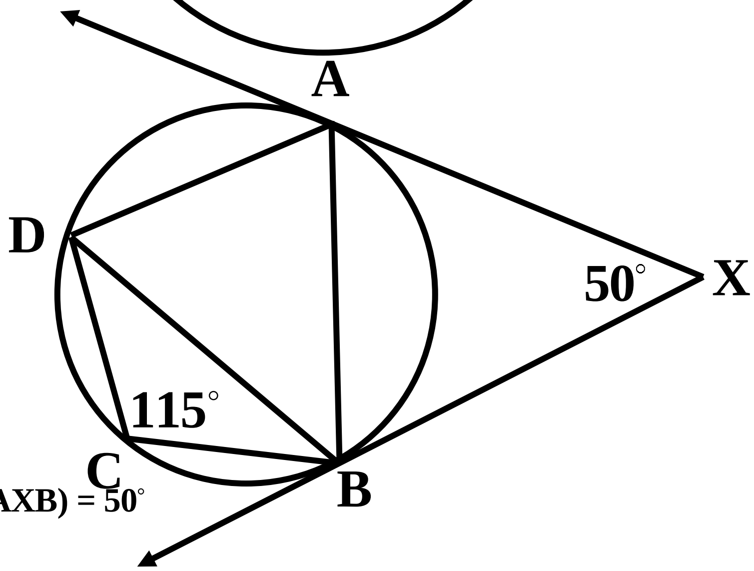
In the opposite figure : $m(\angle B) = 80^\circ$, $\overline{AD} \parallel \overrightarrow{BC}$, $\overrightarrow{CF}$ bisect $\angle$ DCE , $m(\angle DCF) = 50^\circ$ prove that ABCD is a cyclic quadrilateral.



b) ABC is an equilateral triangle inscribed in a circle $D \in \overset{\frown}{AB}$ the point $E \in \overline{DC}$ where AD = DE Prove that : Δ ADE is an equilateral triangle



[73] In the opposite figure:



$\overrightarrow{XA}$, $\overrightarrow{XB}$ are two tangents at A , B , $m(\angle AXB) = 50^\circ$, $m(\angle DCB) = 115^\circ$, prove that :

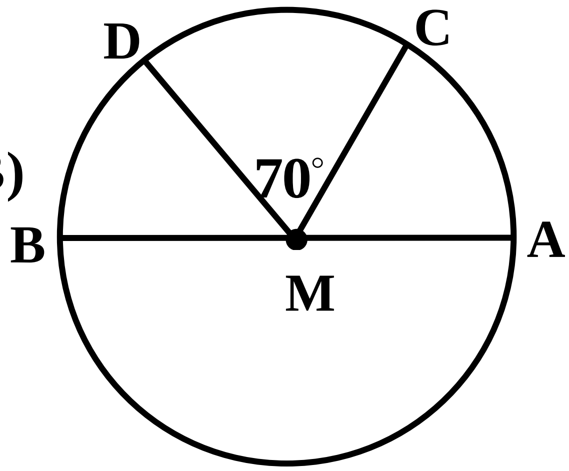
i) $\overrightarrow{AB}$ bisects $(\angle DAX)$

ii) BA = BD

[74] **In the opposite figure:**

$\overline{AB}$ is a diameter of the circle M

$m(\angle CMD) = 70^\circ$, $m(AB) : m(DB) = 5 : 6$ Find: $m(ACD)$



[75] **In the opposite figure:**

$\overline{AB}$ is a diameter in the circle M

then complete:

1) $x = ...$ 2) $m(AC) = ...^\circ$

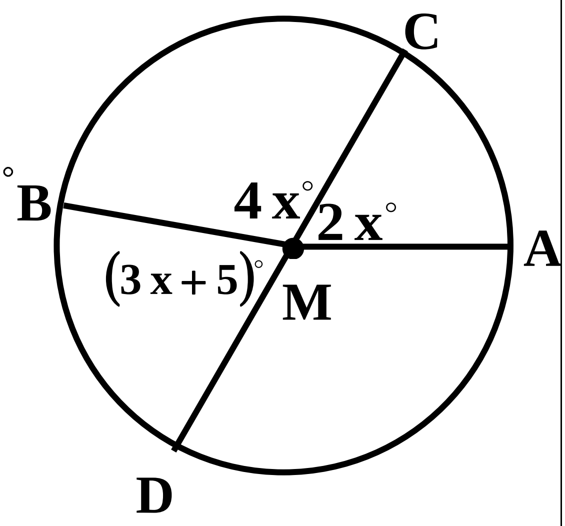
3) $m(AD) = ...^\circ$ 4) $m(BC) = ...^\circ$

5) $m(CAD) = ...^\circ$

6) $m(CBD) = ...^\circ$

7) $m(ACD) = ...^\circ$

8) $m(ADC) = ...^\circ$

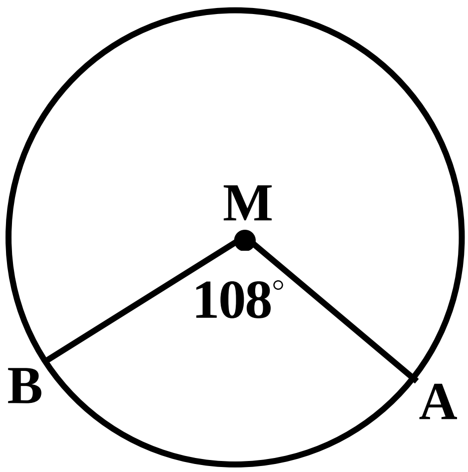


[76] **In the opposite figure:**

M is a circle with radius 5 cm

$m(AB) = 108^\circ$, find:

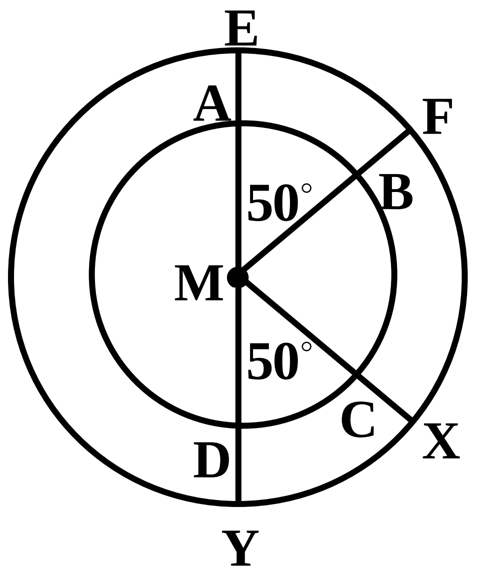
The length of AB , $(\pi = 3.14)$



[77] **In the opposite figure:**

two concentric circles, the radius length of the small circle is 7 cm the radius length of the large circle is 8 cm

$\left(\pi = \frac{22}{7}\right)$ then complete:



In the small circle:

1) $m(AB) = m(......) = ...^\circ$

2) The length of $AB = \frac{50}{360} \times 2 \times \frac{22}{7} \times ...... = ...$ cm.

3) length of $CD = ... \times .... = ...$cm

In the large circle:

1) $m(EF) = m(......) = ...^\circ$,

length of $EF = ... \times .... = ...$cm

Length of $XY = ... \times ...... = ...$cm.

[78] **In the opposite figure:**

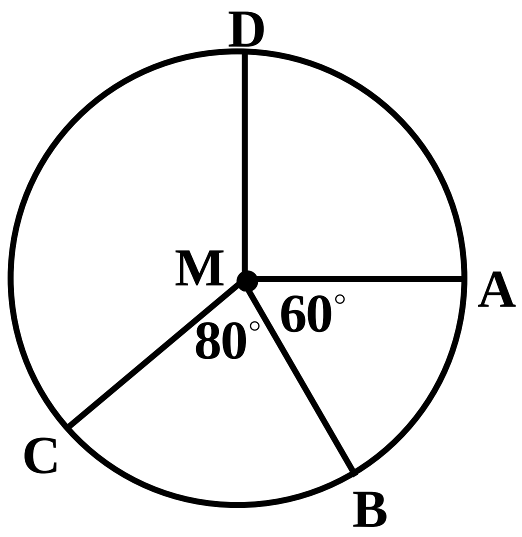
$m(AB) = 60^\circ, m(BC) = 80^\circ$,

$m(AD) : m(DC) = 4 : 7$

a) State the equal arcs in measure

b) State the equal arcs in length

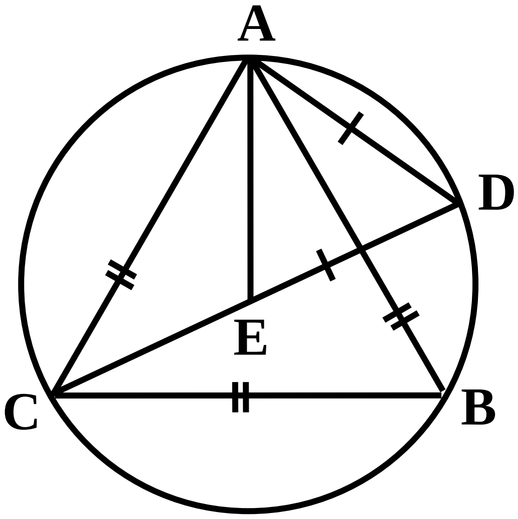
c) Draw the equal chords



[79] **In the opposite figure:**

M is a circle , $\overleftrightarrow{CD}$ is a tangent at C , $\overline{AB}$, $\overline{EF}$ are two chords in the circle where: $\overline{AB} // \overline{EF} // \overleftrightarrow{CD}$

Prove that : CE = CF



[80] In the opposite figure:

M is a circle with radius length 15 cm , $\overline{AB}$, $\overline{CD}$ two parallel chords in the circle , m(AC) = 80° length of AC = length of AB

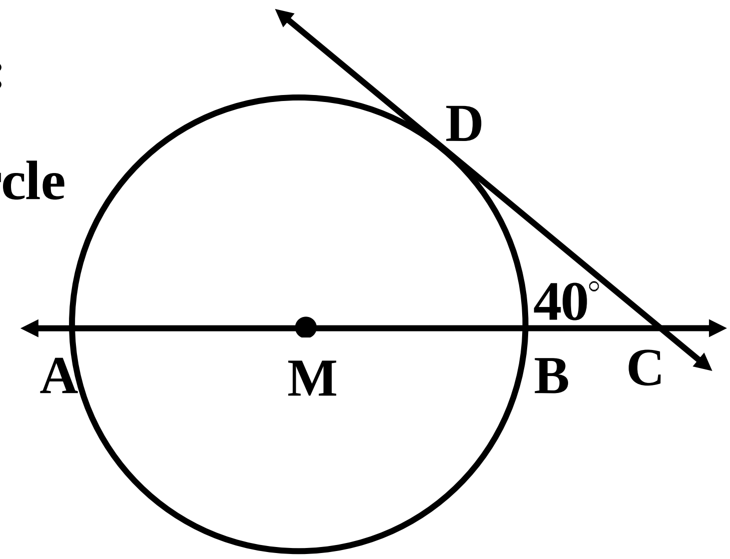
a) m(∠MAB) b) m(CD)

c) Length of CD

[81] In the opposite figure:

$\overleftrightarrow{CD}$ is a tangent of the circle M at D , find:

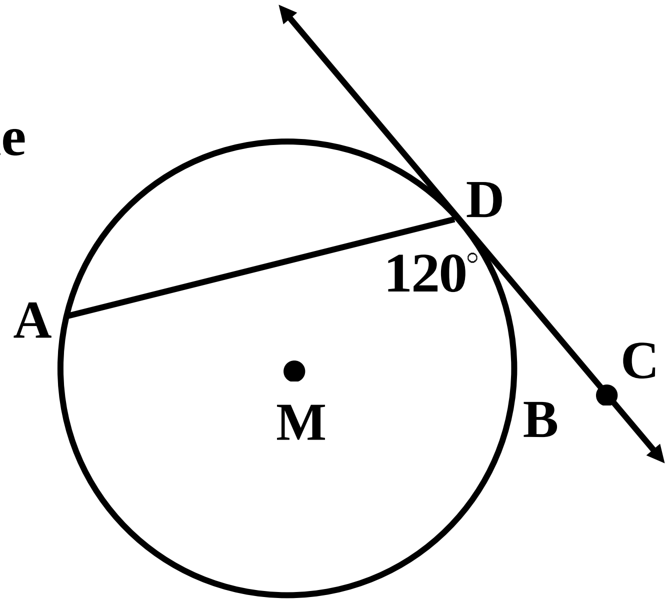
a) m(DB) b) m(AD)



[82] In the opposite figure:

$\overleftrightarrow{CD}$ is a tangent of the circle M at D

find : m(ABD)



[83] In the opposite figure:

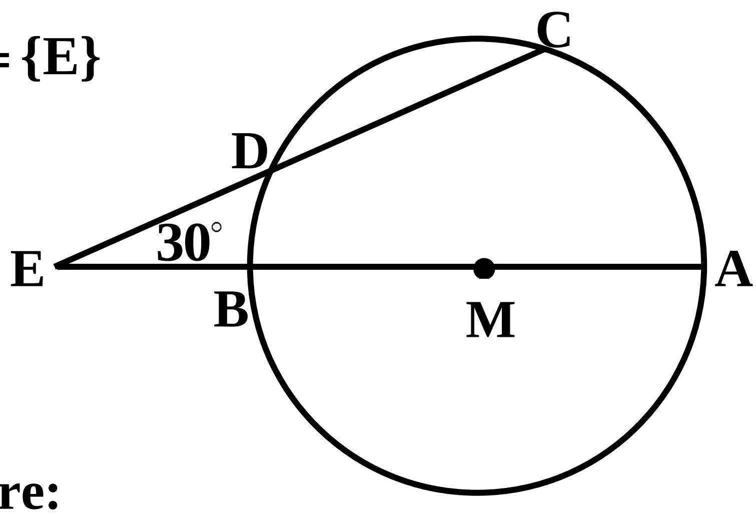
$\overline{AB}$ is a diameter in

the circle M $\overrightarrow{AB} \cap \overrightarrow{CD} = \{E\}$

, m(∠AEC)=30°,

m(AC) = 80° ,

find m(CD)



[84] In the opposite figure:

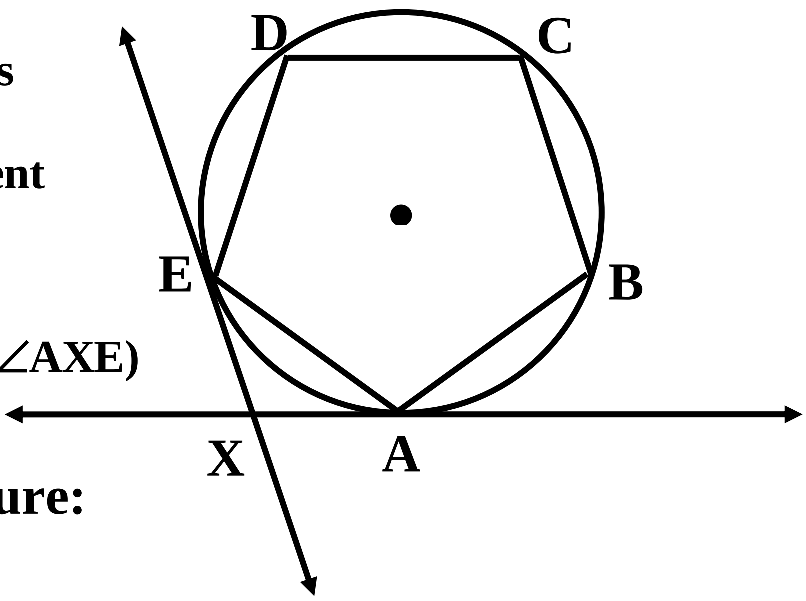
ABCDE is a regular pentagon

drawn in the circle M $\overleftrightarrow{AX}$ is

a tangent at A $\overleftrightarrow{EX}$ is a tangent

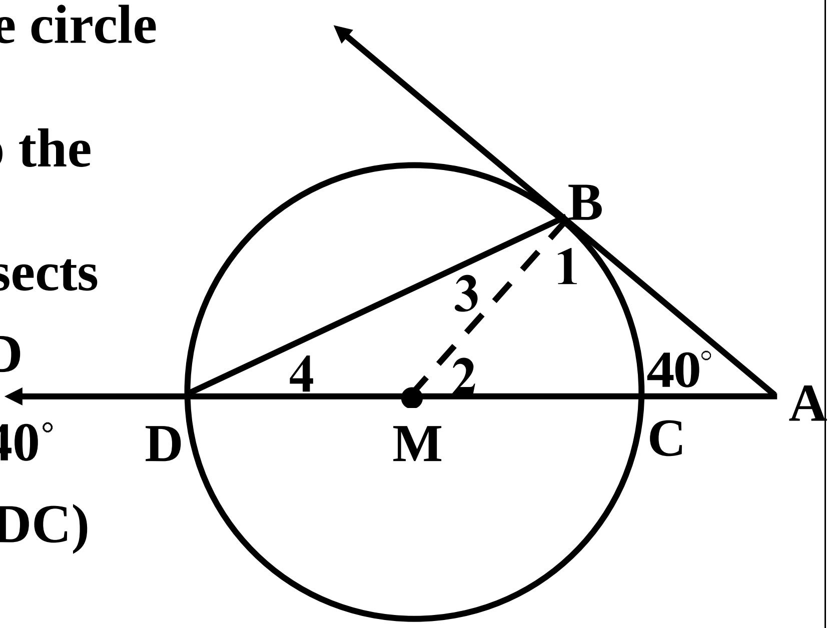
at E where $\overleftrightarrow{AX} \cap \overleftrightarrow{EX} = \{X\}$

Find : a) m(AE) b) m(∠AXE)



[85] In the opposite figure:

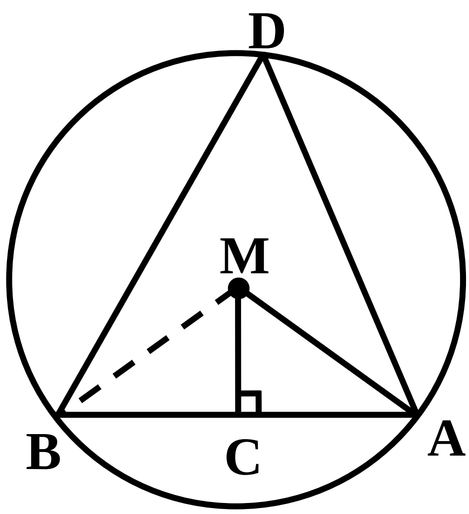
A is a point outside the circle M , $\overrightarrow{AB}$ is a tangent to the circle at B , $\overrightarrow{AM}$ intersects the circle M at C and D respectively $m(\angle A) = 40^\circ$ find with proof $m(\angle BDC)$



[86] In the opposite figure:

$\overline{AB}$ is a chord of circle M ,$\overline{MC} \perp \overline{AB}$ Prove that:

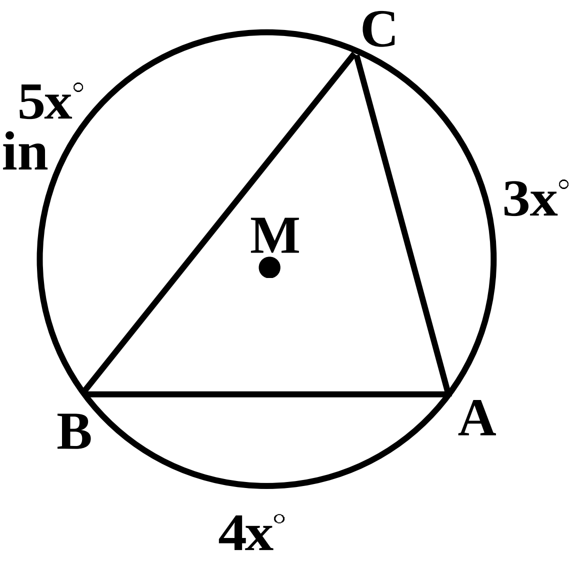
$m(\angle AMC) = m(\angle ADB)$



[87] In the opposite figure:

ABC is an inscribed triangle in circle M ,

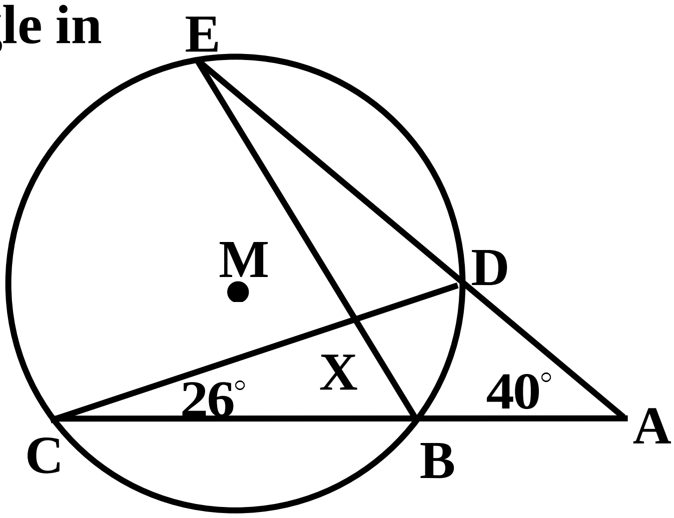
$m(AB) : m(BC) : m(AC) = 4 : 5 : 3$ find $m(\angle ACB)$



[88] In the opposite figure:

ABC is an inscribed triangle in circle M ,

$m(AB) : m(BC) : m(AC) = 4 : 5 : 3$ find $m(\angle ACB)$

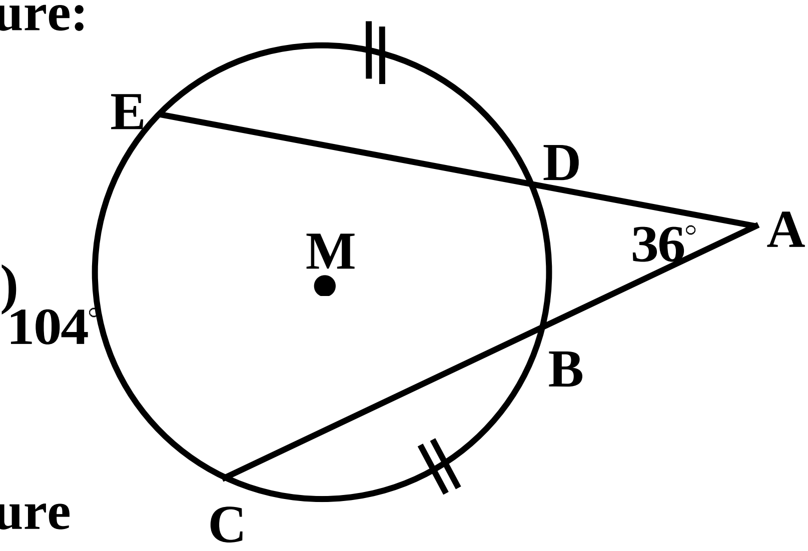


[89] In the opposite figure:

$m(\angle A) = 36^\circ$,

$m(EC) = 104^\circ$ find:

a) m(BD) b) m(DE)

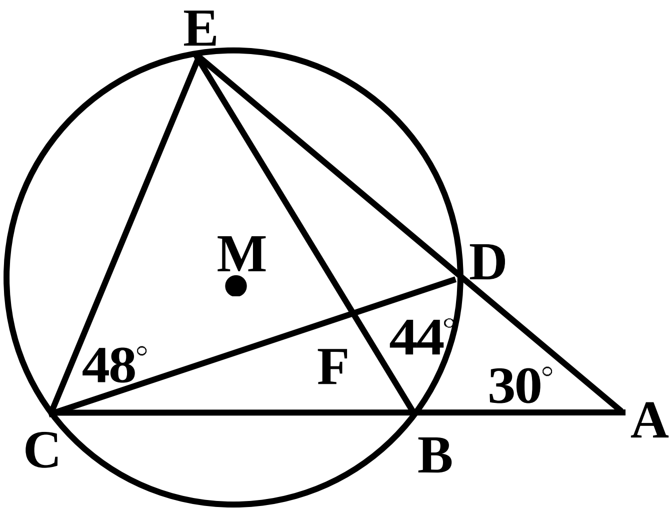


[90] In the opposite figure

$\overrightarrow{CB} \cap \overrightarrow{ED} = \{A\}$, $\overline{BE} \cap \overline{CD} = \{F\}$ if :

$m(\angle A) = 30^\circ$, $m(BD) = 44^\circ$

$m(\angle DCE) = 48^\circ$, find: 1) m(CE) 2) m(BC)

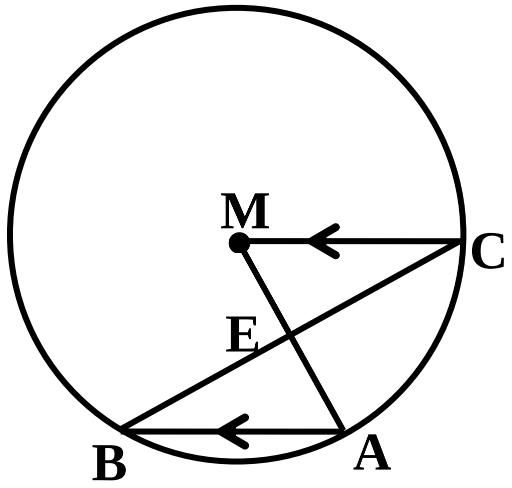


[91] In the opposite figure

$\overline{AB}$ is a chord in circle M , $\overline{CM}$ // $\overline{AB}$

$\overline{BC} \cap \overline{AM} = \{E\}$, prove that:

BE>AE

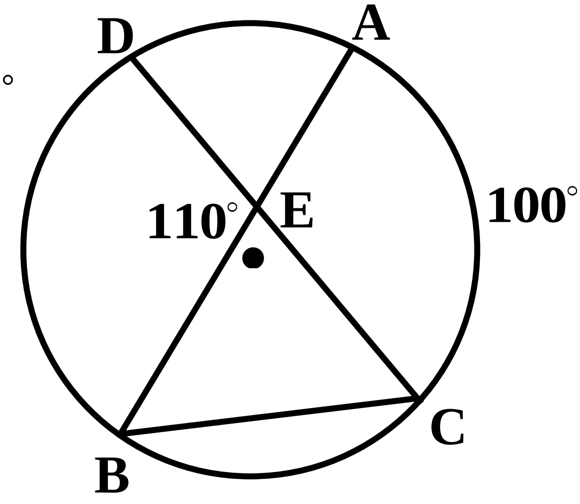


[92] In the opposite figure

$\overline{AB}$ and $\overline{CD}$ are two chords in the circle , $\overline{AB} \cap \overline{CD} = \{E\}$

$m(\angle DEB) = 110^\circ$, $m(AC) = 100^\circ$

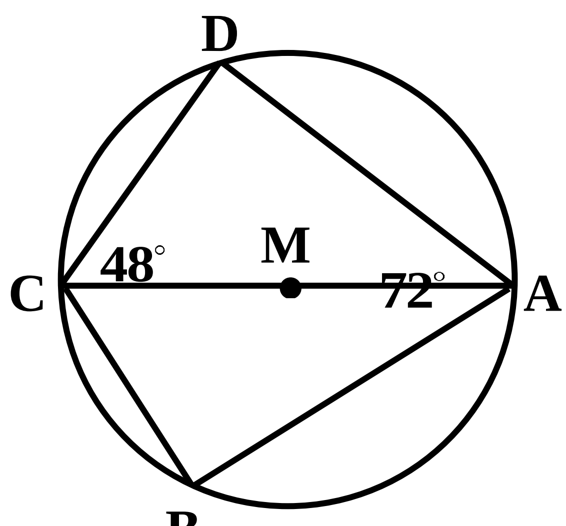
Find: $m(\angle DCB)$



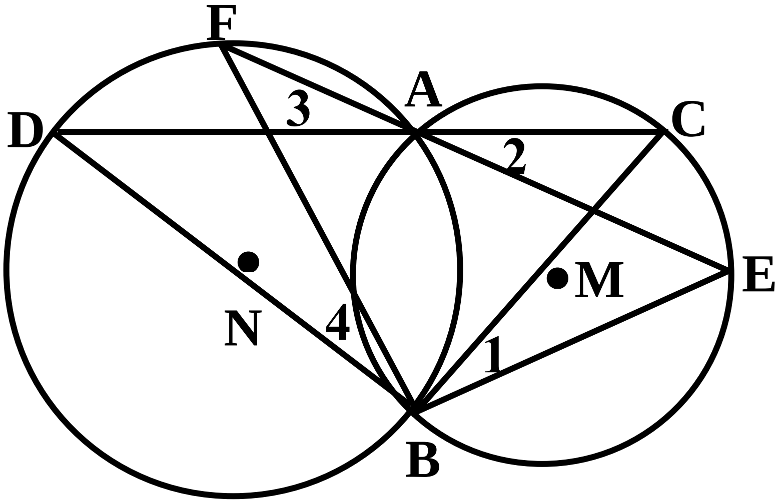
[93] In the opposite figure

Find $m(\angle BAC)$

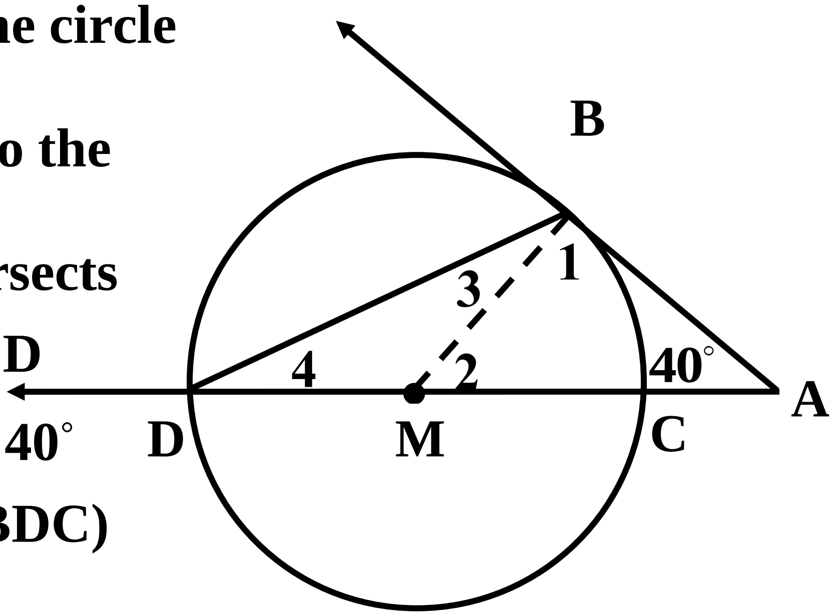
[94] In the opposite figure



M and N are two intersecting circles at A and B , $\overleftrightarrow{AC}$ intersects the circle M at C and intersects the circle N at D , $\overleftrightarrow{AE}$ intersects the circle M at E , and the circle N at F. prove that: m(∠EBC) = m(∠FBD)



[95] In the opposite figure:
A is a point outside the circle M , $\overrightarrow{AB}$ is a tangent to the circle at B , $\overrightarrow{AM}$ intersects the circle M at C and D respectively m(∠A) = 40° find with proof m(∠BDC)



[96] Complete:

1) The number of symmetry axes in the isosceles Triangle is ………..
2) The measure of the angle of tangency equals half the measure of………………………………………………..

3) The two arcs intercepted by a chord in a circle and a parallel tangent to it ………………………………

4) In the cyclic quadrilateral ABCD , if :

$m(\angle A) = \frac{1}{2} m(\angle C)$, then $m(\angle A) =$ ....

5) If the quadrilateral is a cyclic, then each two opposite angles of it are ………………………

6) The inscribed angles intercepted the same arc are ……………………

7) The measure of the tangency angle equals the measure of ………… angle which has the same arc.

8) If the measure of an arc of circle $= 60^\circ$, then its length = ………..….. The circumference of the circle.

9) If $\overline{AB}$ and $\overline{AC}$ are two tangent – segments to the Circle M at B and C then $\overleftrightarrow{MA}$ is the symmetry Axis of ....

10) The centre of the inscribed circle of any triangle is The point of intersection of ……………..

[97] Complete:

1) The distant between the two points (2 , 6) and (- 1 , 6) equals ….……… Length unit.

2) The two tangent-segments drawn from a point outside a circle to it are …….

3) The inscribed angles that intercept the same arc are ……..…

4) In the cyclic quadrilateral ABCD , if $m(\angle A) = 2m(\angle B) = 5m(\angle C)$ then $m(\angle D) =$ ....

5) If the points M, A, B, C, and D are coplanar points such that MA = MB = MC = MD then the figure ABCD is ……..

6) The measure of the arc intercepted by an inscribed angle with measure 90° = ……

7) The length of a rectangle is 6 cm. and its perimeter is 16 cm. then its area = ……… cm^2

8) ABCD is a cyclic quadrilateral. if $m(\angle B) = 60^\circ$ Then $m(\angle D) = \ldots\ldots\ldots\ldots$

9) If the two measures of two arcs in a circle are equal Then their chords are ……..

10) The two tangents drawn at the two ends of a Diameter of a circle are ………

[98] Complete:

1) The inscribed angle drawn in a semicircle is …….

2) The measure of the arc that represents $\frac{1}{9}$ the Measure of the circle = ...

3) If the measures of two angles in a trapezium are 100° and 110°, then the measures of the two other angles respectively are (......... and ....)

4) The area of a square is 16 cm^2, then its perimeter = ………………..

5) The measure of the circle = ………

6) The number of tangents drawn to a circle from a point outside = …………….

7) The length of arc that represent $\frac{1}{4}$ the circumference Of a circle = ...

8) The inscribed angle that is opposite to a minor arc in A circle is ……….. Angle.

9) In the cyclic quadrilateral, each two opposite angles Are ……….

10) The measure of the tangency angle equals half the Measure of ……………

[99] Complete:

1) The measure of the exterior angle of a cyclic Quadrilateral ……………. the interior angle that opposite To the adjacent angle.

2) If the total area of the faces of a cube equals 294 cm^2 then the length of each edge of the cube = ……..….

3) The product of the two slops of two orthogonal straight lines equals …………….

4) The perimeter of the square = The side length $\times$............

5) The two parallel chords in a circle intercept two arcs …………… in measure.

6) The ratio between the two sums of measures of the Interior angles of two similar polygons equals the Ratio ……………

7) Twice the measure of the tangency angle …………. the measure of the central angle that has the same arc of It.

8) The measure of a semicircle equals ……….. While the Length of arc of the semicircle whose radius length is r equals ………..

9) The length of the arc that opposite a central angle Of measure 120° of a circle with radius length

2.1 cm. is .... (Where $\pi = \frac{22}{7}$)

10) In an orthogonal coordinate, if $\overline{AB}$ is a diameter of a Circle whose centre M where A (3 , 4) and B (3 , - 2) , then the coordinates of M = (…… , …..)

[100] Complete:

1) The area of the square whose side length is L equals …………. Square unit
2) The radius length of a circle M is r , then the central Angle whose measure 90° is opposite to an arc with Length ……………..
3) The measure of the arc which represents $\frac{2}{5}$ the measure of the circle = ...
4) The centre of the circumcircle of any triangle is the point of intersection of …………..…
5) The number of common tangents drawn to two Distant circles is ………..…..
6) The parallelogram has ………….. Symmetry axes.
7) The measure of the semicircle whose radius length is r = ………………
8) The measure of an arc of a circle equals twice the measure of ……………
9) The altitude of the triangle ……..………
10) The complementary of the acute angle is ………..… angle.

[101] Complete:

1) The perimeter of an equilateral triangle is 12 cm. then the side length of this triangle = ………. Cm

2) The number of symmetry axes of the isosceles trapezium = ...

3) If the area of a square is 144, then its perimeter Equals .... cm

4) In the cyclic quadrilateral ABCD , if $m(\angle B) = 80^\circ$ Then $m(\angle D) = ...$

Solution:

[96]

1) 1

2) Central angle subtended by the same arc

3) are equal in measure

4) $m(\angle A) + 2m(\angle A) = 180^\circ \Rightarrow m(\angle A) = 60^\circ$

5) Supplementary

6) Equal in measure

7) Inscribed

8) $\frac{60}{360} = \frac{1}{6}$

9) $\overline{BC}$

10) The bisectors of its interior angles.

[97]

1) $\sqrt{(2-(-1))^2 + (6-6)^2} = \sqrt{3^2} = 3$

2) Equal in length

3) Equal in measure

4) $m(\angle C) + 5m(\angle C) = 180^\circ \Rightarrow m(\angle C) = \frac{180^\circ}{6} = 30^\circ$

$m(\angle A) = 5 \times 30^\circ = 150^\circ \Rightarrow m(\angle B) = 150^\circ \div 2 = 75^\circ$

$m(\angle D) = 180^\circ - 75^\circ = 105^\circ$

5) Cyclic quadrilateral.

6) 180°

7) $W = \frac{P}{2} - L = \frac{16}{2} - 6 = 8 - 6 = 2 \Rightarrow A = 6 \times 2 = 12 \text{ cm}^2$

8) 120°

9) Equal in length

10) Parallel

[98]

1) 135°

2) $\frac{1}{9} \times 360^\circ = 40^\circ$

3) $(80^\circ , 70^\circ)$

4) 16

5) 360°

6) 2

7) $\frac{1}{4} \times 2 \pi r = \frac{\pi r}{2}$

8) Acute angle

9) Supplementary

10) Central angle subtended by the same arc

[99]

1) Equal the measure

2) $S^2 = \frac{294}{6} = 49 \qquad \therefore S = \sqrt{49} = 7 \text{ cm}$

3) – 1

4) 4

5) Equal

6) 1

7) =

8) πr

9) $\frac{120}{360} \times 2 \times \frac{22}{7} \times 2.1 = 4.4$ cm

10) $\left(\frac{3-3}{2}, \frac{-2-4)}{2}\right) = (0, -3)$

[100]

1) L^2

2) $\frac{90}{360} \times 2 \times \pi \times r = \frac{\pi \times r}{2}$

3) $\frac{2}{5} \times 360^\circ = 144^\circ$

4) The intersection of the axes of its sides

5) 4

6) 0

7) 180°

8) Inscribed angle subtended by this arc

9) are concurrent

10) Acute

[101]

1) $12 \div 3 = 4$ cm

2) 1

3) $S = \sqrt{144} = 12$ cm $\Rightarrow$ $P = 12 \times 4 = 48$ cm

4) 100°

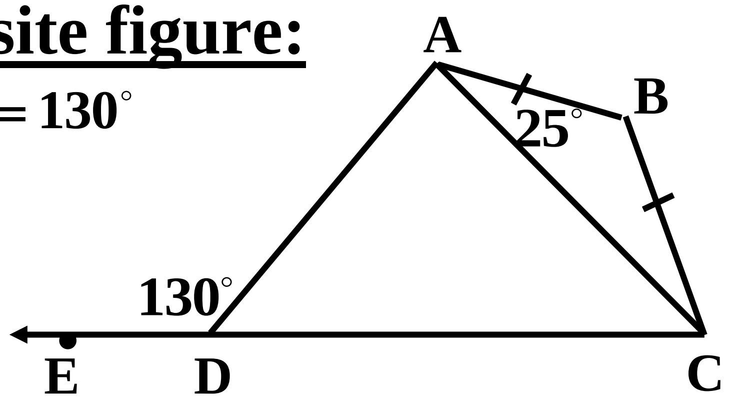
[102] In the opposite figure:

$BA = BC$, $m(\angle ADE) = 130^\circ$

And $m(\angle BAC) = 25^\circ$

Prove that ABCD is

A cyclic quadrilateral



[103] In the opposite figure:

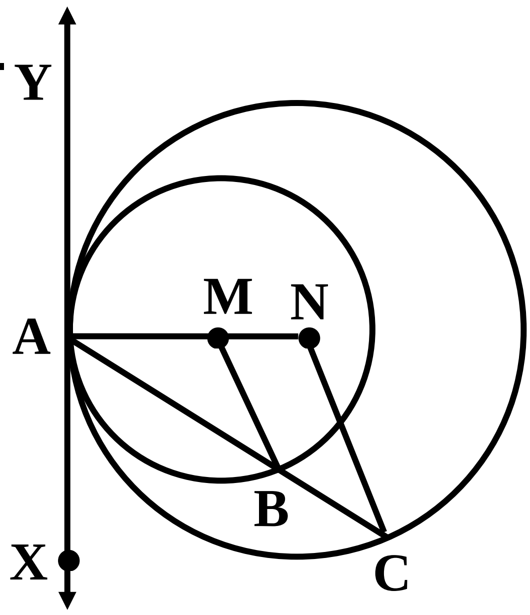
$\overleftrightarrow{XY}$ is a common tangent to the

Two circles M and N that

Touching internally at A

Prove that:

$m(\overset{\frown}{AB}) = m(\overset{\frown}{AC})$



[104] In the opposite figure:

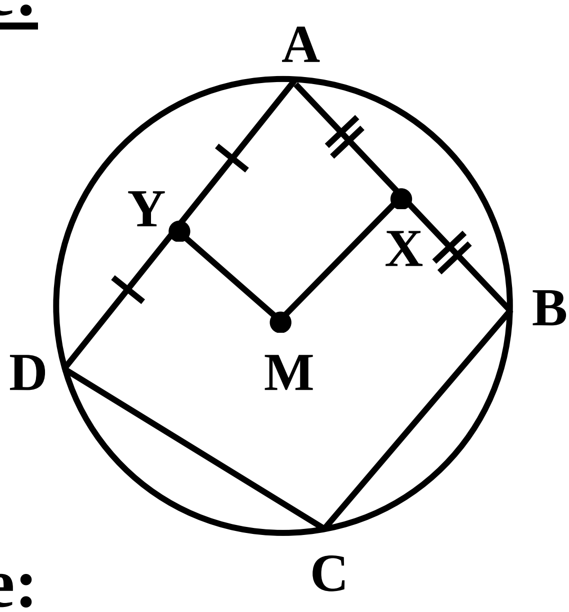
X is the midpoint of $\overline{AB}$ and Y

Is the midpoint of $\overline{AD}$

Prove that :

1) The figure AXMY is a cyclic Quadrilateral

2) $m(\angle XMY) = m(\angle C)$



[105] In the opposite figure:

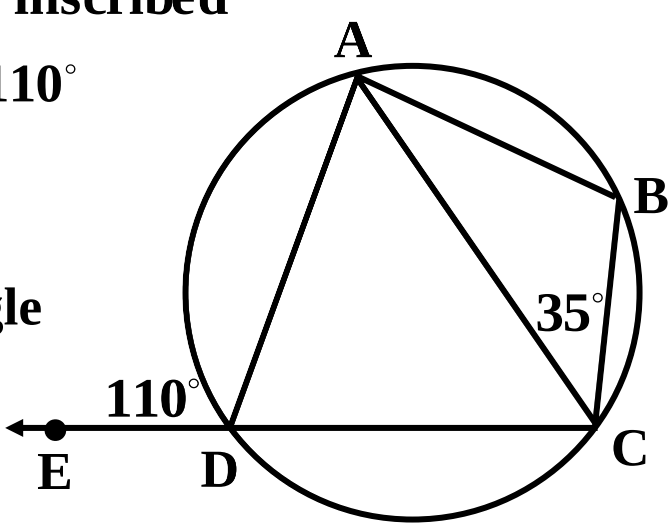
ABCD is a quadrilateral inscribed

in a circle, $m(\angle ADE) = 110^\circ$

And $m(\angle ACB) = 35^\circ$

Prove that:

ABC is an isosceles triangle



[106] In the opposite figure:

M and N are two circles

Touching externally at A

$\overleftrightarrow{BC}$ is a common

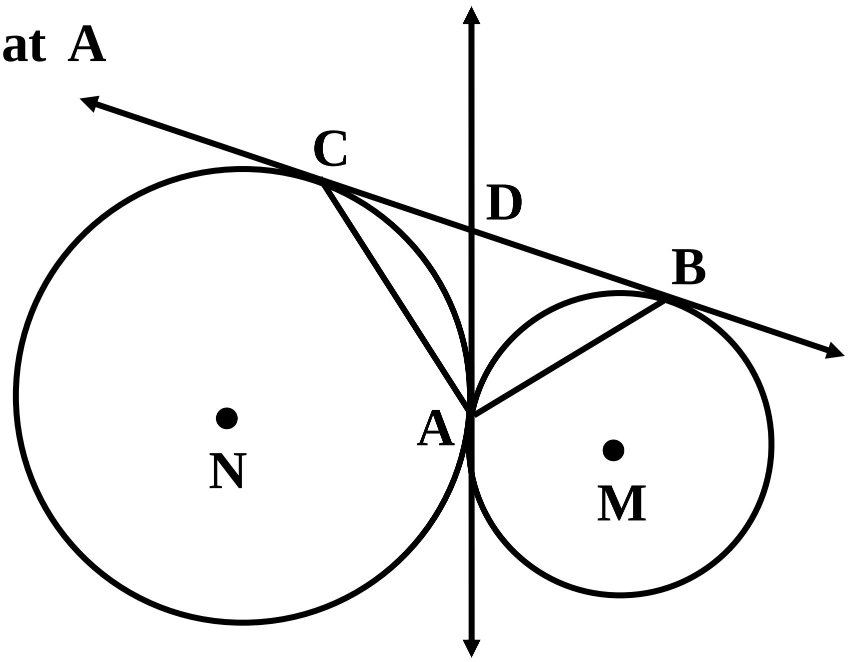
Tangent to the two

Circles at B and C

And $\overleftrightarrow{AD}$ is

A common tangernt

To them at A



Prove that:

1) $m(\angle BAC) = 90^\circ$

2) $\overleftrightarrow{MN}$ is a tangent to the circle passing through A, B and C

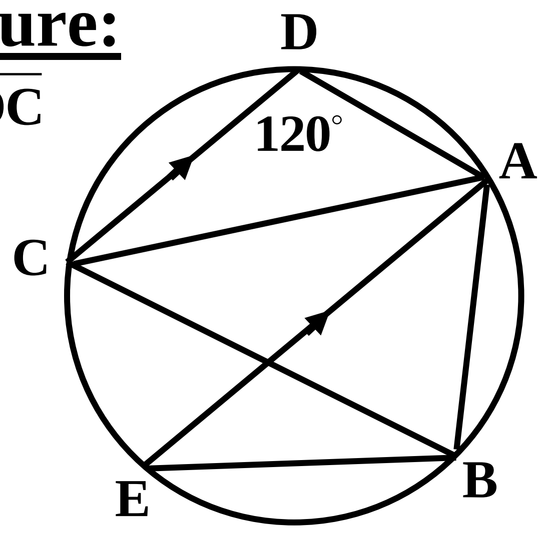
[107] In the opposite figure:

$m(\angle ADC) = 120^\circ$ and $\overline{AE} \parallel \overline{DC}$

1) Find : $m(\angle ABC)$

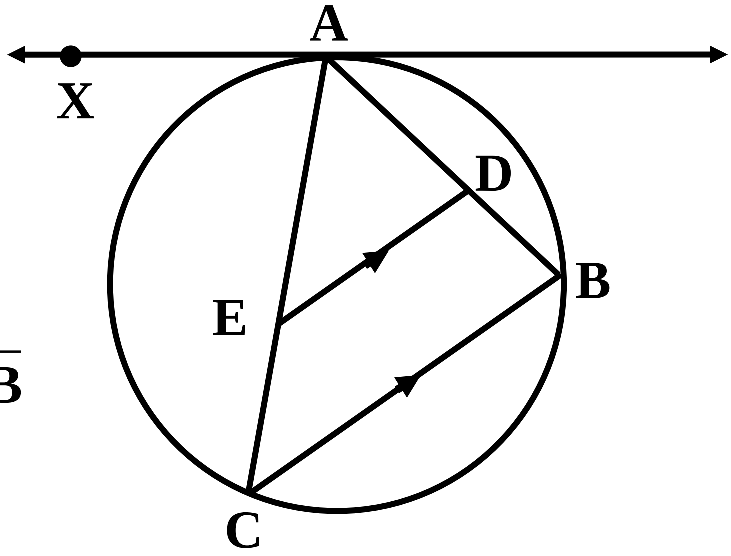
2) Prove that:

$m(\angle ACD) = m(\angle CBE)$



[108] In the opposite figure:

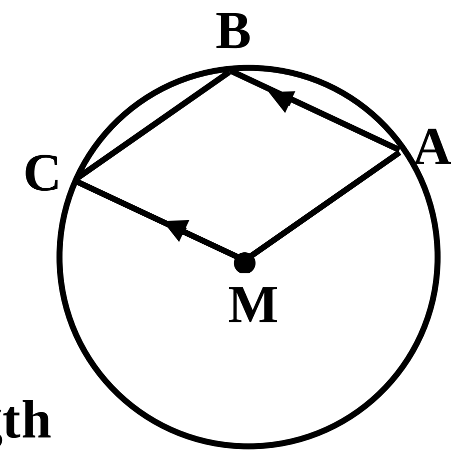
Δ ABC is inscribed in a circle draw $\overleftrightarrow{AX}$ as a tangent to The circle at A draw $\overleftrightarrow{DE}$ // $\overline{BC}$ and to cut $\overline{AB}$ At D and $\overline{AC}$ At E



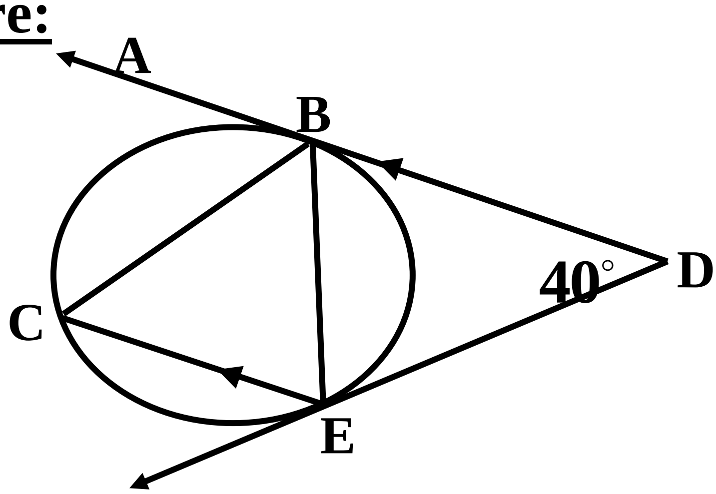
Prove that : $\overleftrightarrow{AX}$ is a tangent to the circle passing through A , D and E

[109] In the opposite figure:

A , B and C are three Points $\in$ the circle M if MA = AB And $\overline{AB}$ // $\overline{MC}$, calculate m($\angle$AMC) and the length of the minor arc $(\overset{\frown}{AC})$ if the the radius length of the circle is 7 cm.



[110] In the opposite figure:



$\overrightarrow{DB}$ and $\overrightarrow{DE}$ are two

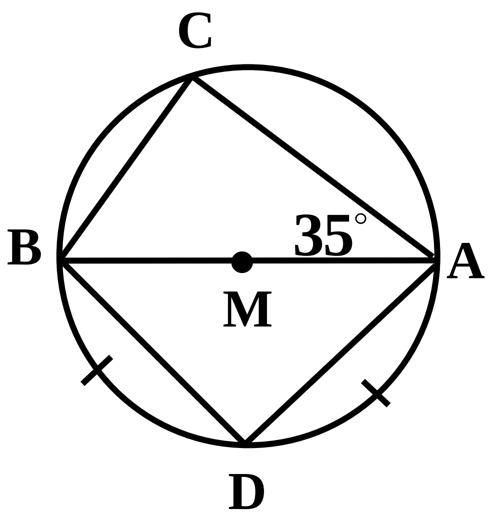
Tangentsto the circle at B

and $E\overrightarrow{DB} // \overline{EC}$ and

$m(\angle D) = 40^\circ$

Find : $m(\angle ABC)$

[111] In the opposite figure:



$\overline{AB}$ is a diameter of the

circle M the length of AD

= the length of BD and

$m(\angle CAB) = 35^\circ$

Find $m(\angle CBD)$

[112] In the opposite figure:

ABCD is a parallelogram.

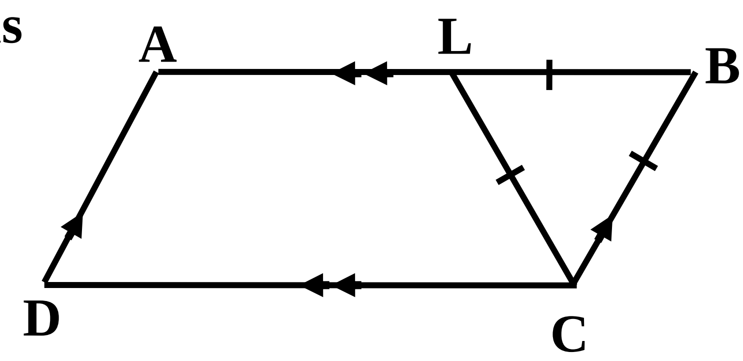
$L \in \overline{AB}$ such that LBC is

An equilateral triangle

Prove that :

The figure ALCD is

A cyclic quadrilateral

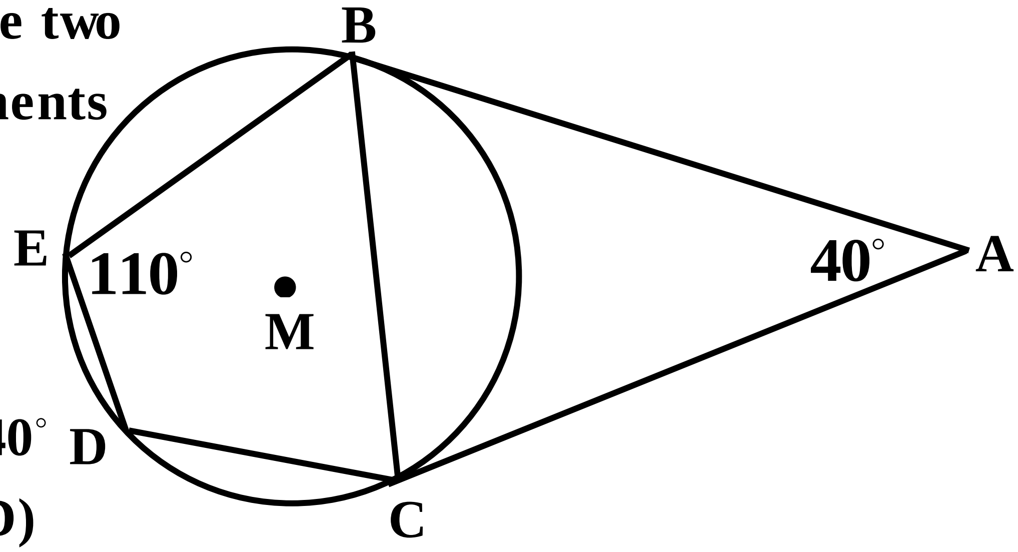


[113] In the opposite figure:

$\overline{AB}$ and $\overline{AC}$ are two tangent – segments to the circle M

$m(\angle DEB) = 110^\circ$ and $m(\angle A) = 40^\circ$

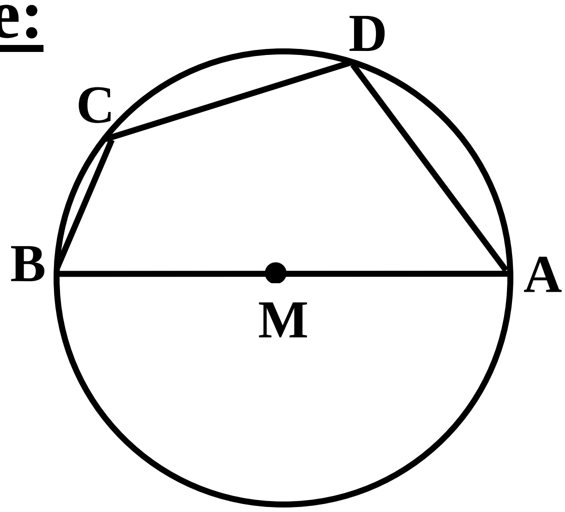
find : $m(\angle ACD)$



[114] In the opposite figure:

M is a circle , $m(\overset{\frown}{AD}) = 80^\circ$ and $m(\overset{\frown}{DC}) = 70^\circ$

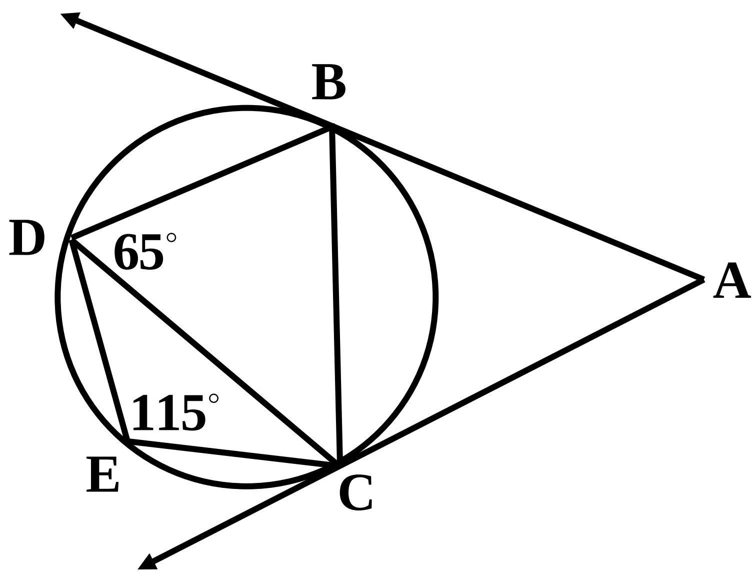
Calculate the measures of the angles of the quadrilateral ABCD



[115] In the opposite figure:

1) Find : $m(\angle ABC)$, $m(\angle DBC)$ And $m(\angle BCD)$

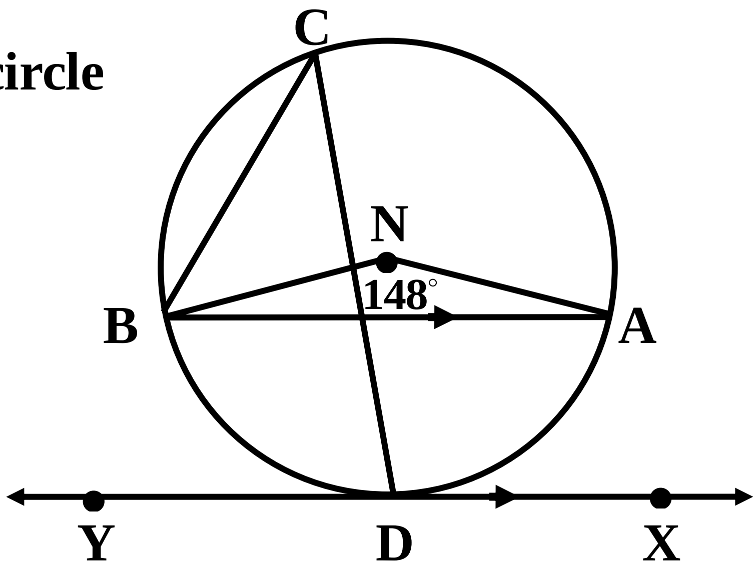
2) Prove that : $\overline{CD}$ Touches the Circumcircle of ΔABC



[116] In the opposite figure:

$\overleftrightarrow{XY}$ is a tangent to the circle N at D and parallel to The chord $\overline{AB}$ if $m(\angle ANB) = 148^\circ$

Find $m(\angle BCD)$

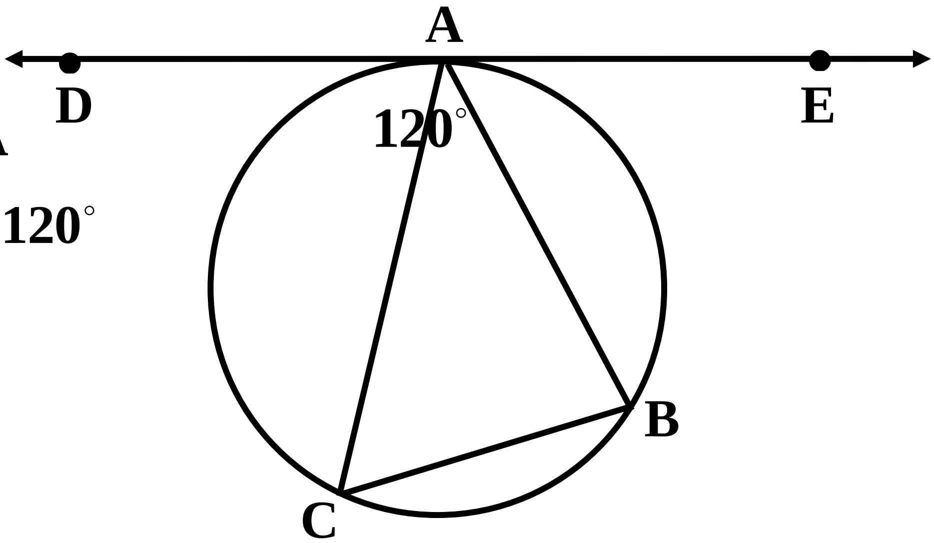


[117] In the opposite figure:

$\overleftrightarrow{ED}$ is a tangent To the circle at A

And $m(\angle DAB) = 120^\circ$

Find : $m(\angle C)$

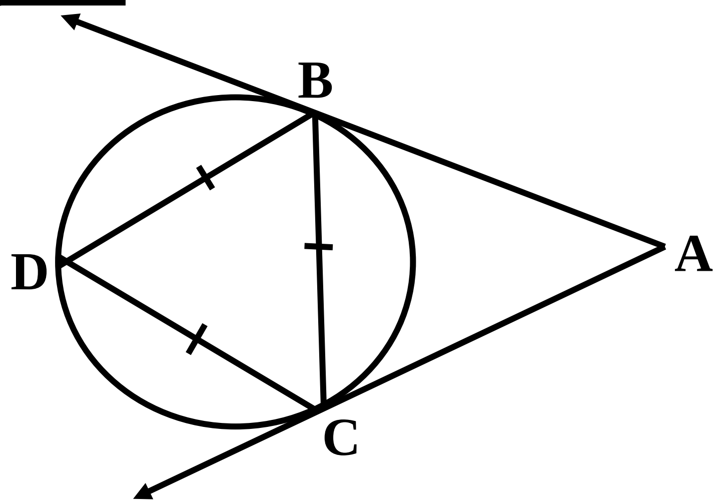


[118] In the opposite figure:

$\overrightarrow{AB}$ and $\overrightarrow{AC}$ are two Tangents to the circle

And BC = CD = DB

Find : $m(\angle A)$



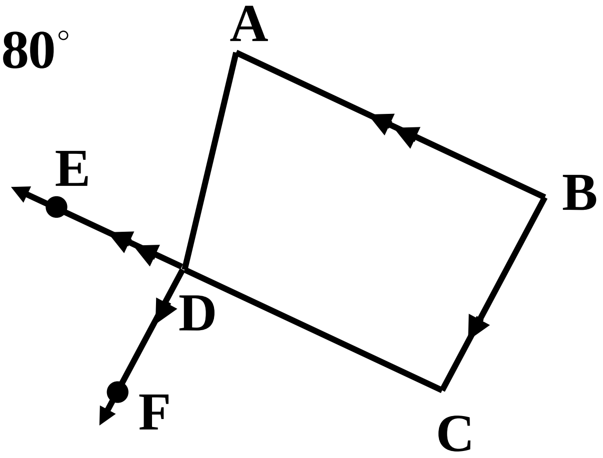
[119] In the opposite figure:

$\overline{AB} \parallel \overline{DE}$, $\overline{BC} \parallel \overline{DF}$

And $m(\angle ADE) + m(\angle CDF) = 180^\circ$

Prove that:

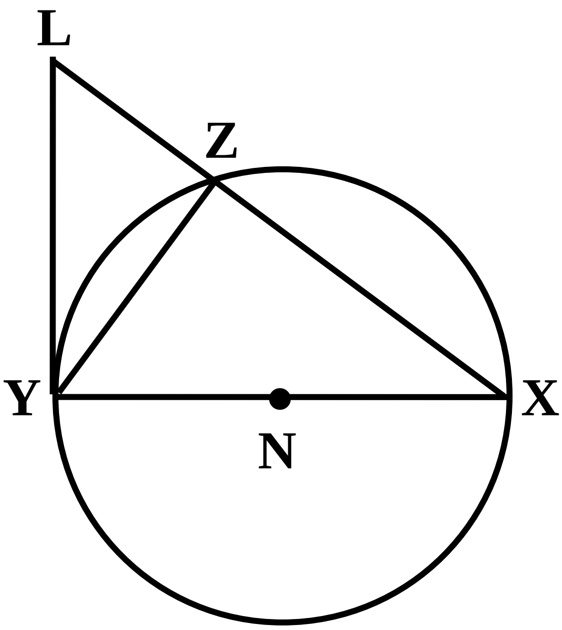
The figure ABCD is a cyclic Quadrilateral.



[120] In the opposite figure:

$\overline{XY}$ is a diameter in the circle N $\overline{XZ}$ is a chord in it.draw $\overrightarrow{YL}$ a tangent to cut $\overrightarrow{XZ}$ at L Prove that :

$\overleftrightarrow{XY}$ is a tangent to the circumcircle of Δ ZYL

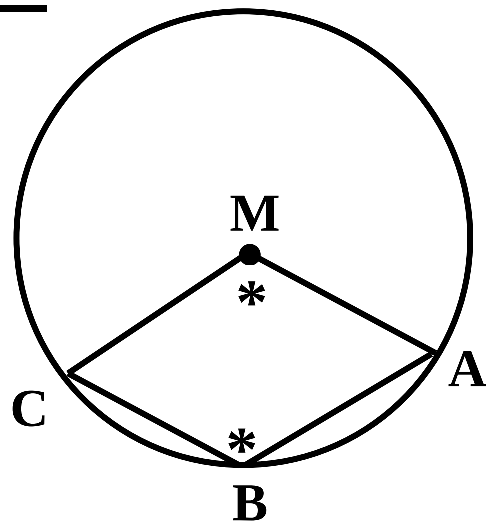


[121] In the opposite figure:

M is the centre of the circle

And $m(\angle AMC) = m(\angle B)$

Find : $m(\angle B)$

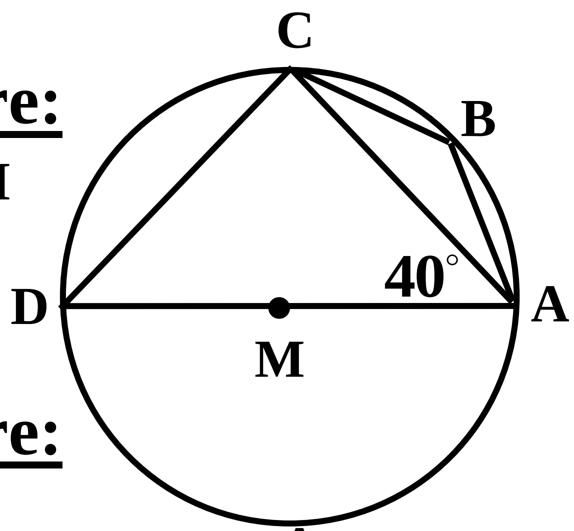


[122] In the opposite figure:

$\overline{AD}$ is a diameter in the circle M

And $m(\angle CAD) = 40^\circ$

Find : $m(\angle B)$



[123] In the opposite figure:

ABCD is a quadrilateral

Inscribed in a circle in

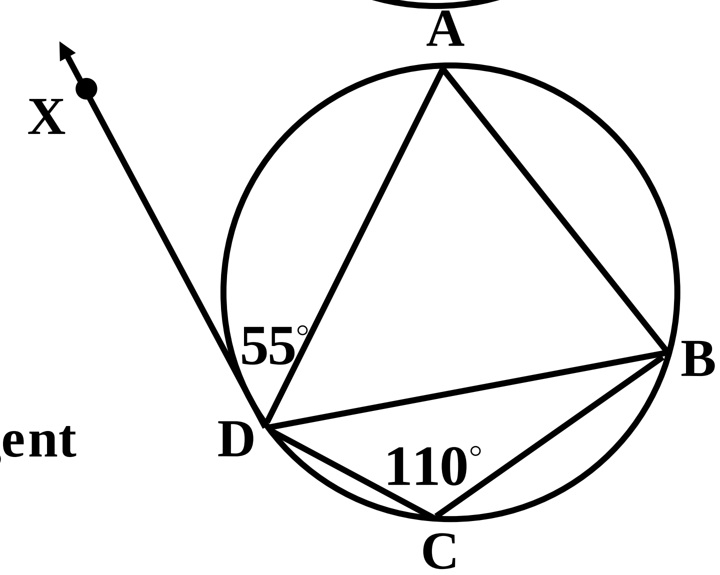
Which AB = AD and

$m(\angle C) = 110^\circ$,

$m(\angle ADX) = 55^\circ$

Prove that : $\overrightarrow{DX}$ is a tangent

To the circle



[124] In the opposite figure:

$\overrightarrow{AE}$ and $\overrightarrow{AC}$ are two

Tangents to the circle

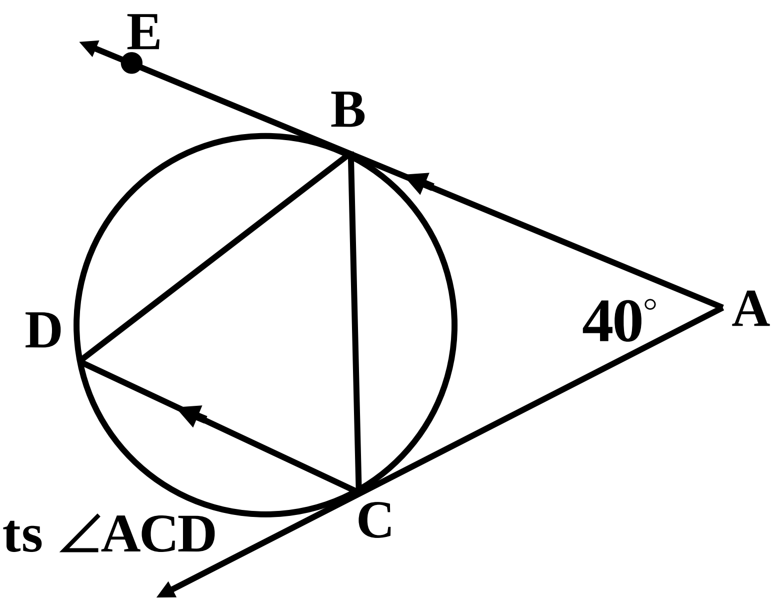
At B and C respectively

$\overrightarrow{AE} \parallel \overline{CD}$ and

$m(\angle A) = 40^\circ$

1) Prove that : $\overrightarrow{CB}$ bisects $\angle ACD$

2) Find : $m(\angle CDB)$



[125] In the opposite figure:

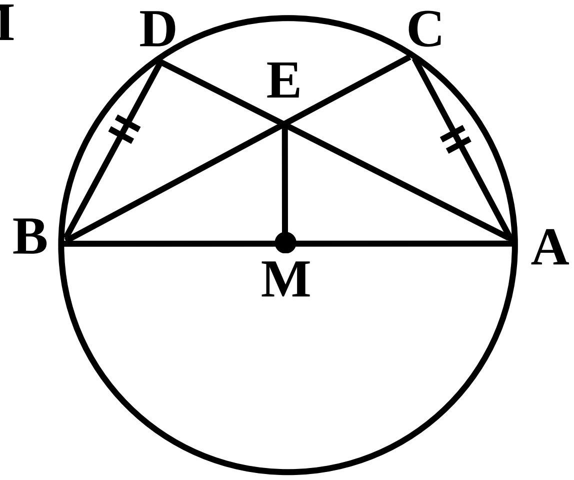
$\overline{AB}$ is a diameter in the circle M

$AC = BD$ and $\overline{AD} \cap \overline{BC} = \{E\}$

Prove that:

1) $m(\overset{\frown}{DC}) = m(\overset{\frown}{DC})$

2) The figure ACEM is A cyclic quadrilateral



[126] In the opposite figure:

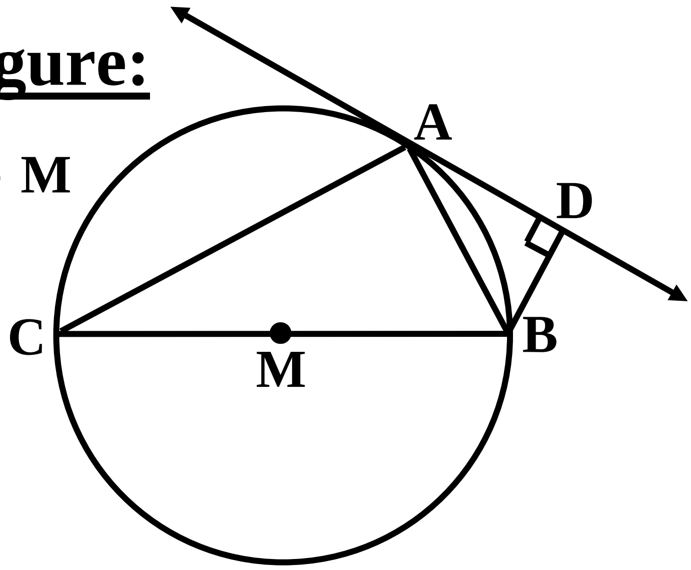
$\overleftrightarrow{AD}$ is a tangent to the circle M

At A, $\overline{BC}$ is a diameter to

The circle M, $\overline{BD} \perp \overleftrightarrow{AD}$

Prove that :

$m(\angle ABD) = m(\angle ABC)$



[127] In the following figure:

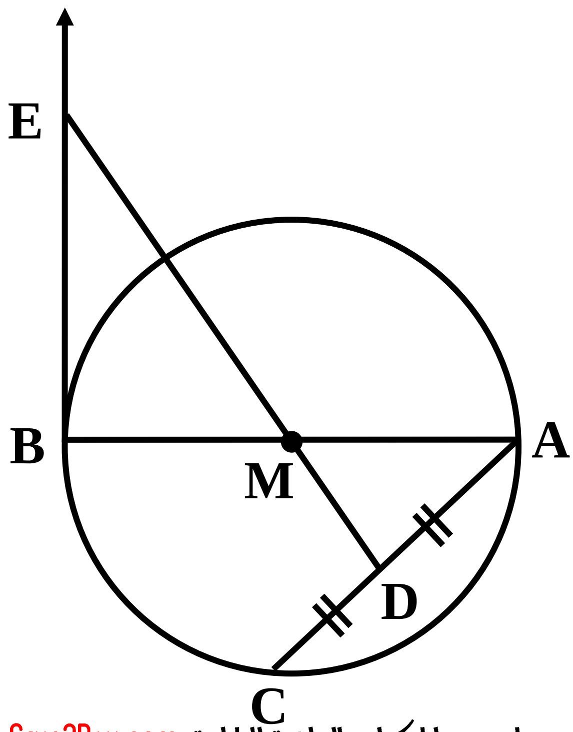
$\overline{AB}$ is a diameter in the

circle M. D is the midpoint of

$\overline{AC}$ and $\overrightarrow{BE}$ is a tangent

to the circle to cut $\overrightarrow{DM}$ at E

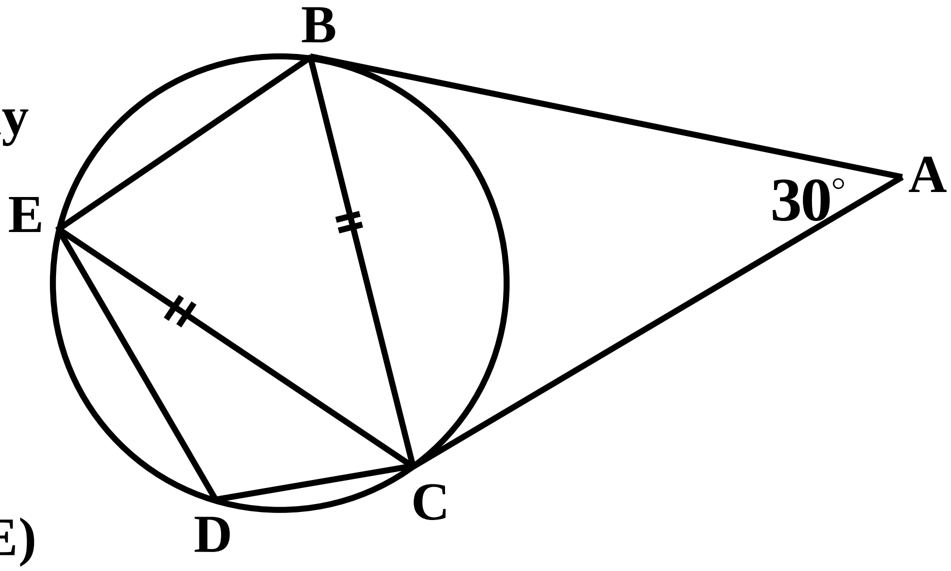
Prove that: 1) the figure ADBE is a cyclic quadrilateral



2) $m(\angle CMB) = m(\angle BED)$

[128] In the opposite figure:

$\overline{AB}$ and $\overline{AC}$ are two tangent – segments to the circle at B And C respectively $m(\angle A) = 30^\circ$ and $CB = CE$



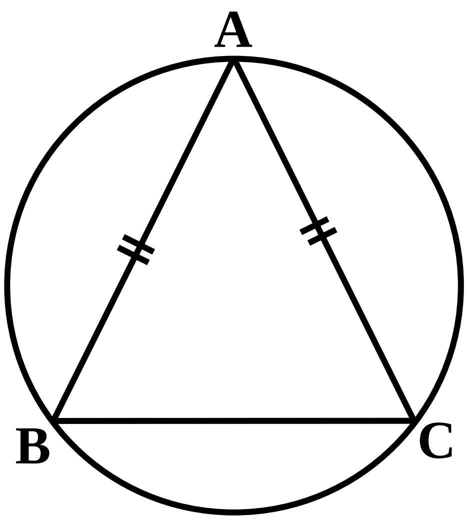
1) Prove that : $\overline{BE} // \overline{AC}$

2) Find : $m(\angle CDE)$

3) Prove that : $\overline{CE}$ is a tangent – segment to the Circle passing through the points A , B and C

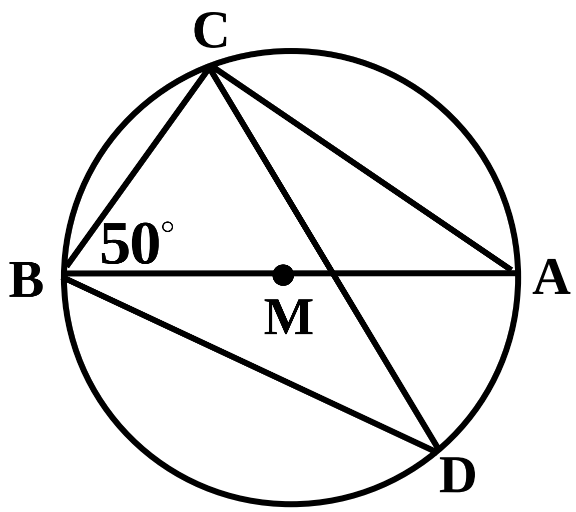
[129] In the opposite figure:

$\overline{AB}$ and $\overline{AC}$ are two chords of A circle , $AB = AC$ and $m\left(\overset{\frown}{AB}\right) = 130^\circ$ Find the measures of the angles of Δ ABC in degrees.



[130] In the opposite figure:

$\overline{AB}$ is a diameter in the circle M And $m(\angle ABC) = 50^\circ$ Find : $m(\angle BDC)$



[131] In the opposite figure:

M is a circle.

$\overrightarrow{AB}$ and $\overrightarrow{AC}$ are

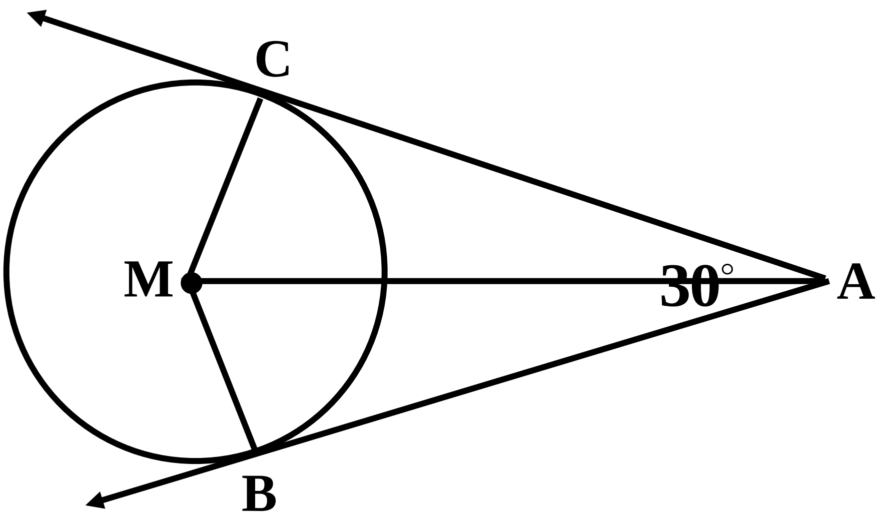
Two tangents to

The circle at B

And C and

$m(\angle BAC) = 30^\circ$

Find : $m(\angle AMB)$



[132] In the opposite figure:

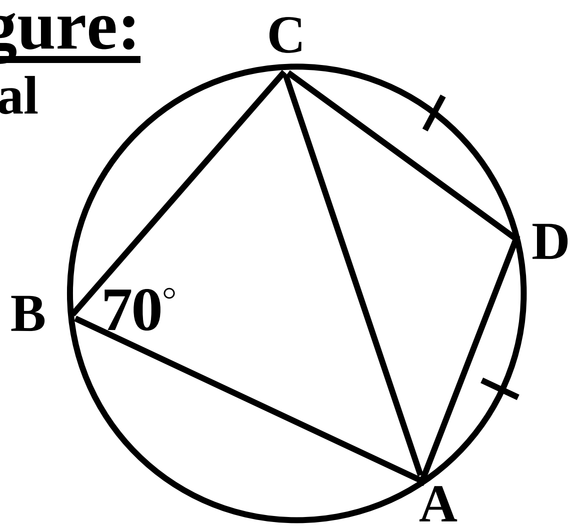
ABCD is a cyclic quadrilateral

in which $m(\angle ABC) = 70^\circ$

The length of AD

= The length of DC

Find : $m(\angle ACD)$



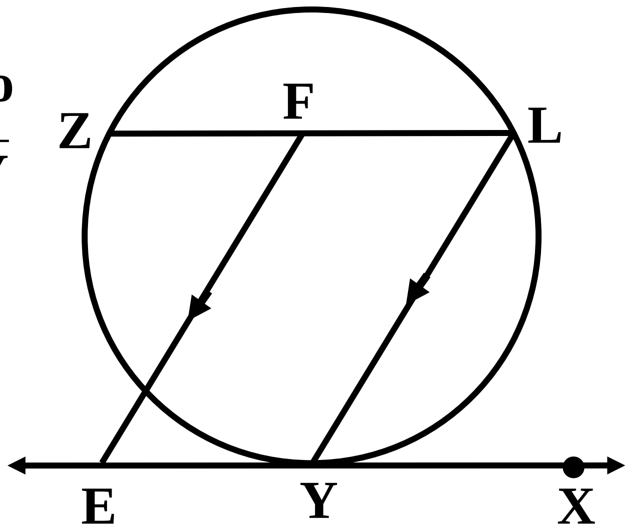
[133] In the opposite figure:

LYZ is a triangle inscribed in A circle , $\overleftrightarrow{XY}$ is a tangent to The circle at Y and $\overline{FE} \parallel \overline{LY}$

Prove that:

1) $m(\angle EYZ) = m(\angle EFZ)$

2) The figure EYFZ is A cyclic quadrilateral



[134] Complete:

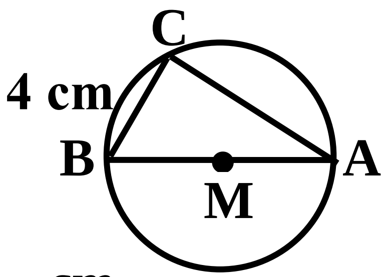
1) Measure of the angle of tangency equals measure of ……………… subtended by the same arc.

2) In the opposite figure:

circle M , $\overline{AB}$ is a diameter ,

$m(\angle A) = 30^\circ$, BC = 4 cm

then the length of the diameter = ... cm.

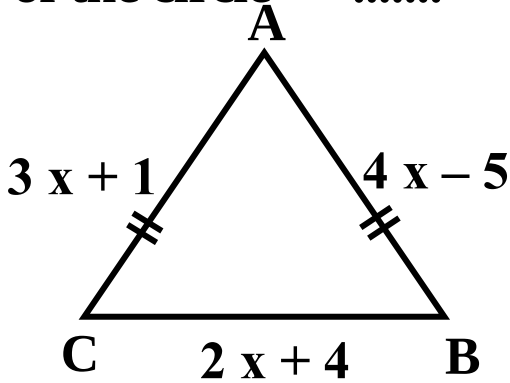


3) In the cyclic quadrilateral each two opposite angles are ………….

4) rectangle its length is 6 cm and its perimeter is 16 cm then its area = ………. cm^2

5) measure of the arc represented $\frac{2}{5}$ of the circle = ...$^\circ$

6) In the opposite figure AB = AC then the numerical value of x = ... unit length.



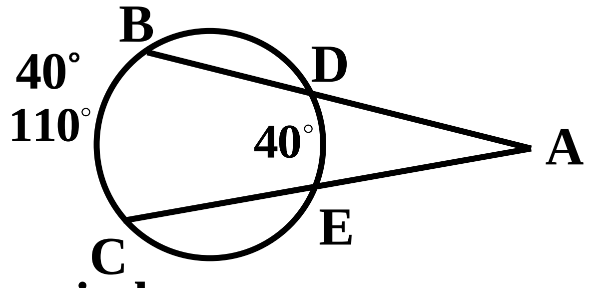
[135] Choose:

1) In the opposite figure:

if m (BC) = 110° , m (DE) = 40°

then m (∠A) = ...

(35° , 55° , 75° , 20°)



2) Number of tangents of two distant circles = ...

(1 , 2 , 3 , 4)

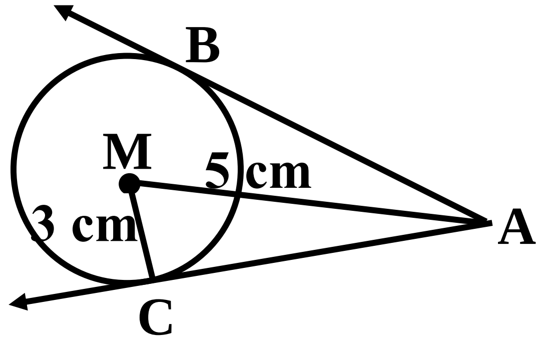
3) In the opposite figure :

$\overrightarrow{AB}, \overrightarrow{AC}$ are two tangents

of the circle M , if

AM = 5 cm , MC = 3 cm

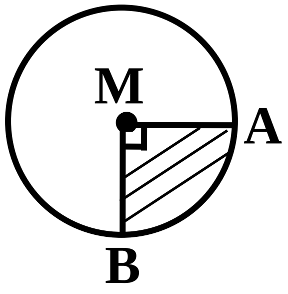
then AB = ... cm



4) In the opposite figure : $\overline{AM}$, $\overline{BM}$ are two perpendicular

radii in the circle M , r = 7 cm π = $\frac{22}{7}$ then the perimeter

of the shaded part = ... cm (14 , 21 , 38.5 , 25)

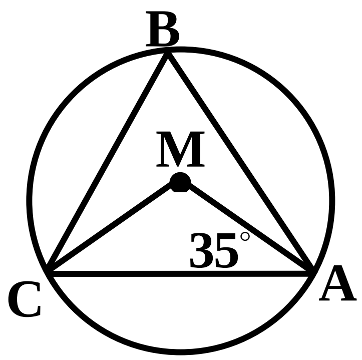


5) In the opposite figure :

M is a circle , m (∠ MAC) = 35°

then m (∠ ABC) = ...°

(70 , 55 , 35 , 50)

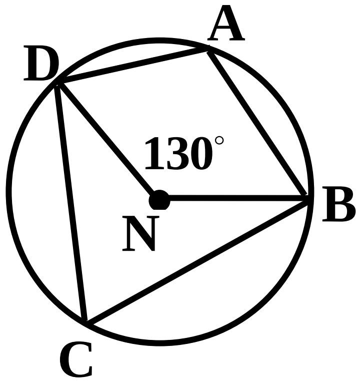


6) In the opposite figure :

ABCD is a quadrilateral drawn in the circle N , if m (∠BND) = 130°

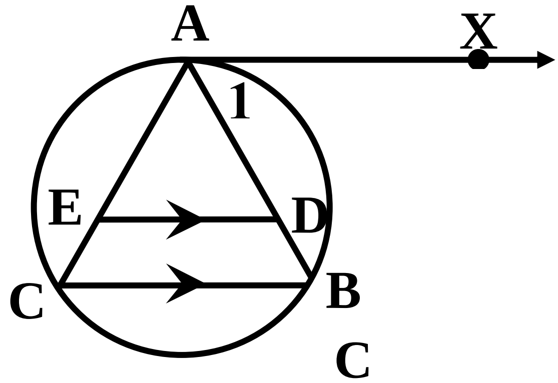
then m (∠ BAD) = ...°

(50 , 130 , 65 , 115)



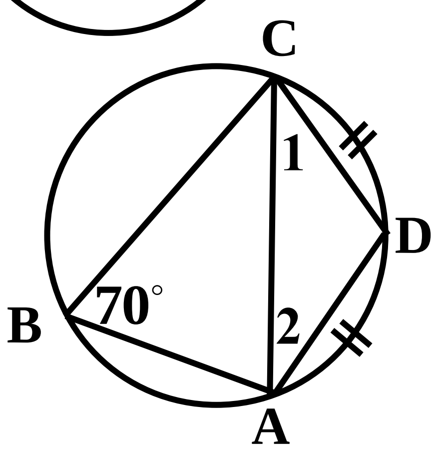
[136]

a) In the opposite figure: $\overrightarrow{AX}$ is a tangent in the circle: $\overline{DE} // \overline{BC}$ prove that : $\overrightarrow{AX}$ is a tangent to the circle passing through the points A, D , E



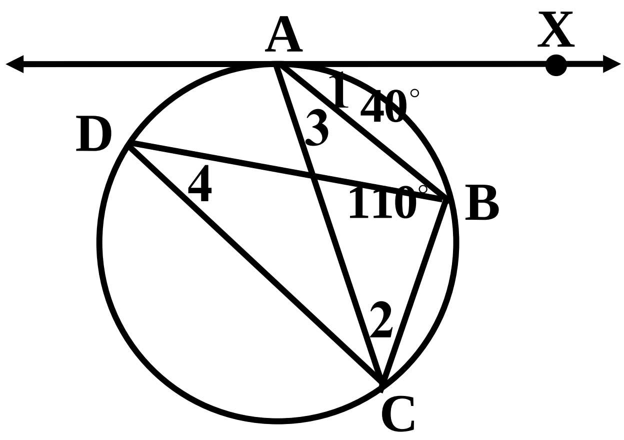
b) In the opposite figure :

ABCD is a cyclic quadrilateral m (∠ ABC) = 70° , length of AD = length of DC find m (∠ ACD)



[137]

a) In the opposite figure: $\overleftrightarrow{AX}$ is a tangent to the circle at A , m (∠ XAB) = 40° m (∠ ABC) = 110° find m (∠ CDB)

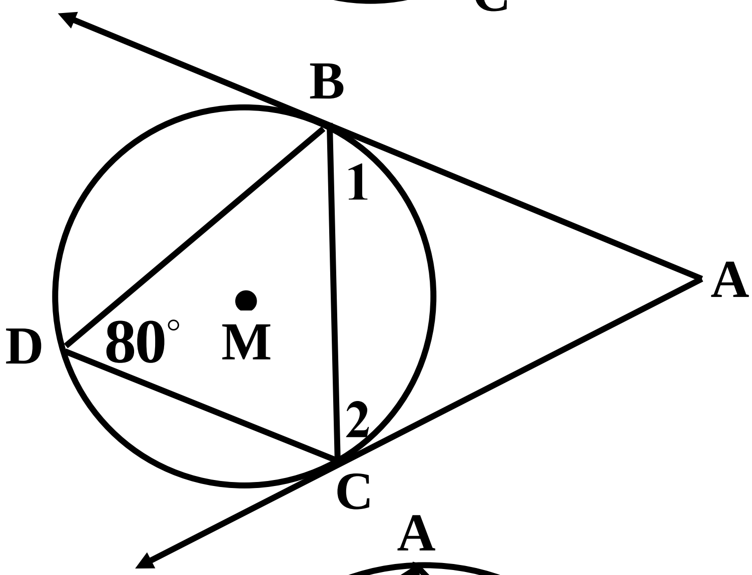


b) In the opposite figure :

$\overrightarrow{AB}, \overrightarrow{AC}$ are two tangents of the circle M at B and C

$m(\angle BDC) = 80^\circ$ find

$m(\angle A)$

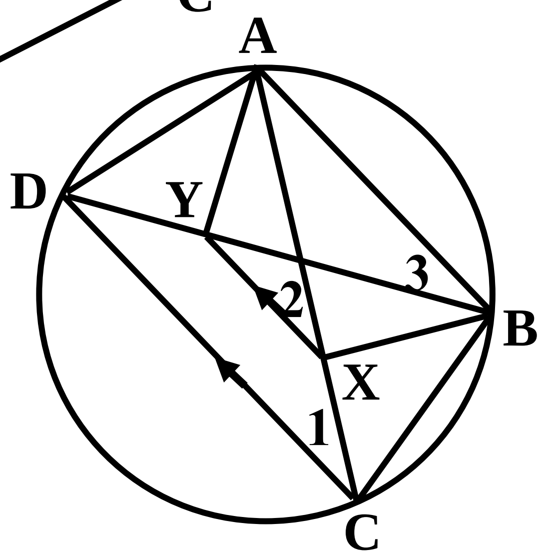


[138]

a) In the opposite figure

: If $\overline{XY} // \overline{CD}$ prove that:

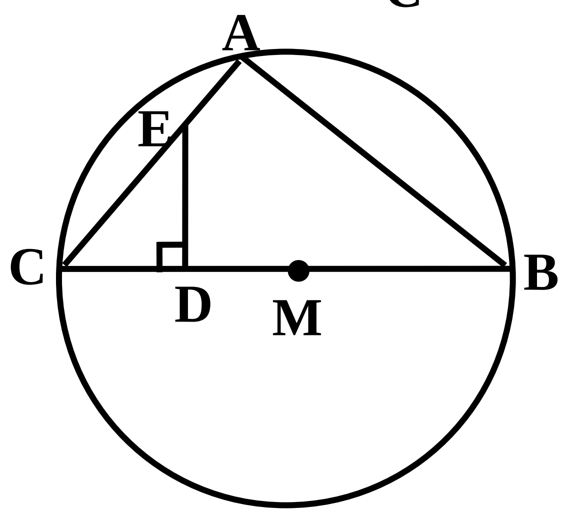
ABXY is a cyclic quadrilateral



b) In the opposite figure :

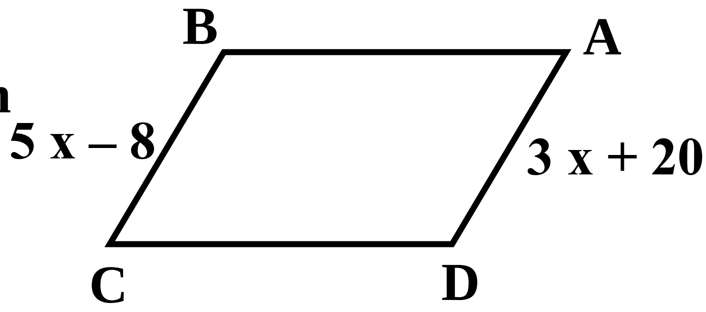
$\overline{ED} \perp \overline{BC}$ prove that :

$m(\angle CED) = \frac{1}{2} m(\overset{\frown}{AC})$

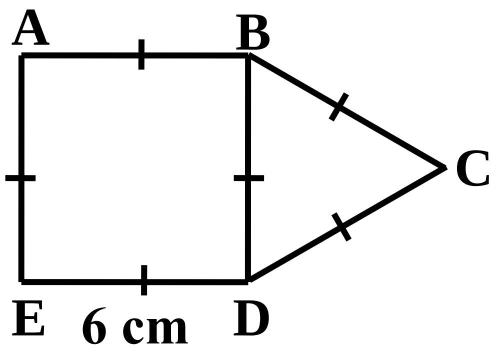


[139] Complete:

1) Measure of the angle of tangency equals measure of ……………..…… subtended by the same arc.
2) The centre of the inscribed circle of any triangle is point of intersection ………………...
3) Measure of a semi-circle = ………….
4) In the opposite figure ABCD is a parallelogram Where AD = 3 x + 20 BC = 5 x – 8 then the value of x = ……..……



5) The inscribed angles subtended by equal arcs are ………………...
6) In the opposite figure: Perimeter of the shape ABCDE = …………. Cm



[140] Choose:

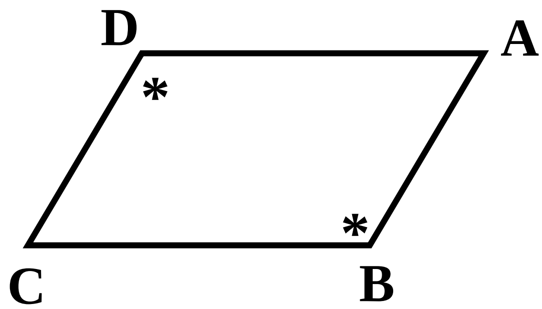
1) In the opposite figure:

If m (∠ A) + m (∠C) = 140°

m (∠ B) = m (∠ D)

then m (∠ D) = ……°

(50 , 55 , 110 , 220)



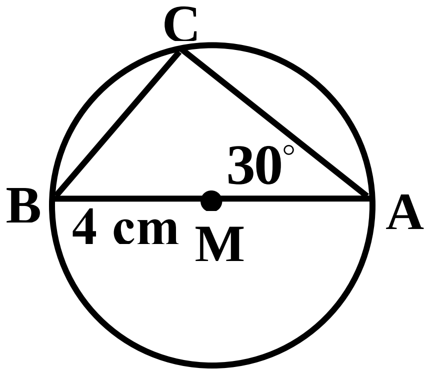
2) The ratio between the measure of the central angle to the measure of the inscribed angle subtended by the same arc = ……… (3 : 1 , 2 : 1 , 1 : 2 , 1 : 1)

3) In the opposite figure:

$\overline{AB}$ is a diameter in the circle M with radius length 4 cm ,

m (∠ A) = 30° then BC = ... cm

(4 , 6 , 8 , 10)

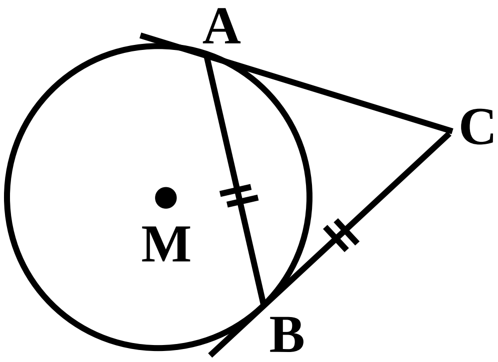


4) In the opposite figure:

$\overline{CB}$, $\overline{CA}$ are two tangents to the circle M , CB = BA

then m (∠ C) = ...°

(60 , 90 , 120 , otherwise)



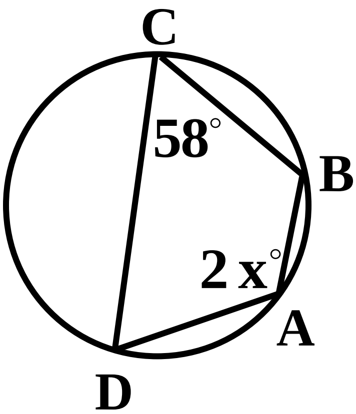
5) Number of common tangents of two distant circles = ……………. (1 , 2 , 3 , 4)

6) In the opposite figure:

m (∠ C) = 58° , m (∠ A) = 2 x°

then the value of x = ... °

(58 , 122 , 119 , 61)



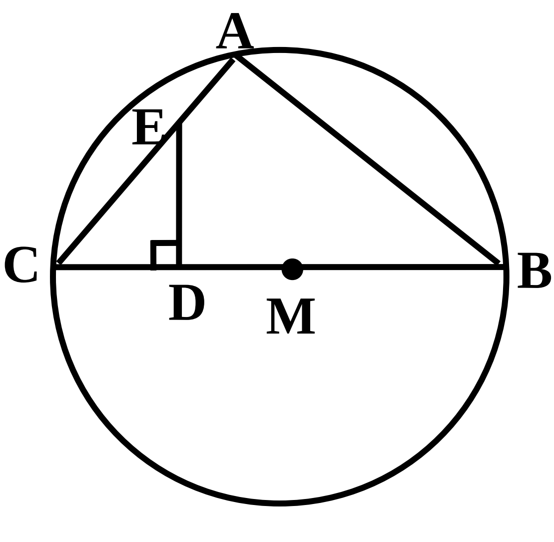
[141]

a) In the opposite figure:

$\overline{ED} \perp \overline{BC}$ prove that:

i) ABDE is a cyclic quadrilateral

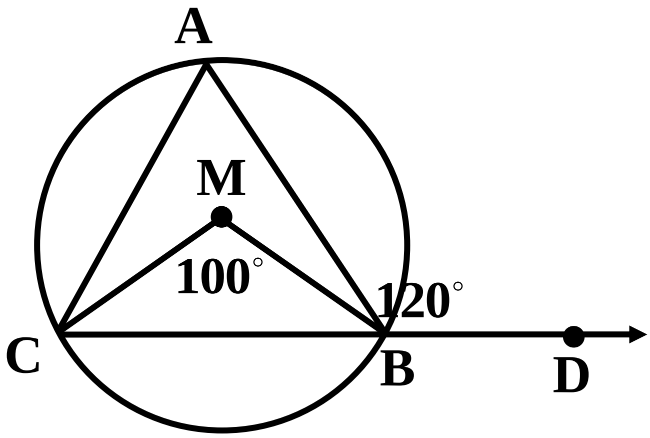
ii) m (∠CED) $= \frac{1}{2}$ m $\left(\overset{\frown}{AC}\right)$



b) In the opposite figure: Δ ABC drawn in the circle M

D $\in$ $\overrightarrow{CB}$ such that m ($\angle$ ABD) = 120°

if m ($\angle$ BMC) = 100° find with proof m ($\angle$ ACB)



[142]

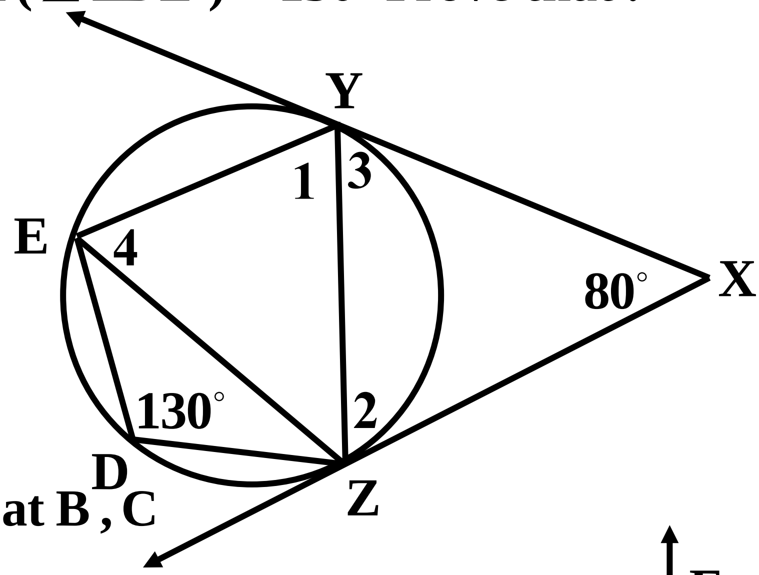
In the opposite figure :

$\overrightarrow{XY}$, $\overrightarrow{XZ}$ are two tangents of the circle at Y and Z ,

m ($\angle$YXZ) = 80° , m ($\angle$ EDZ) = 130° Prove that :

a) ZE = ZY

b) $\overline{XZ}$ // $\overline{YE}$



[143]

In the opposite figure :

two circles intersected at B , C

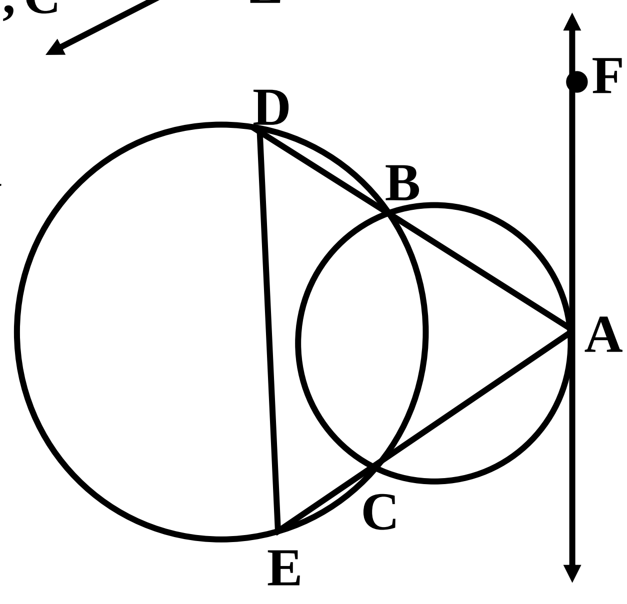
A $\in$ one of them draw $\overleftrightarrow{AF}$

tangent to it at A and draw

$\overrightarrow{AB}$ and $\overrightarrow{AC}$ to cut the

other circle at D , E

prove that $\overleftrightarrow{AF}$ // $\overline{DE}$



[144] In the opposite figure:

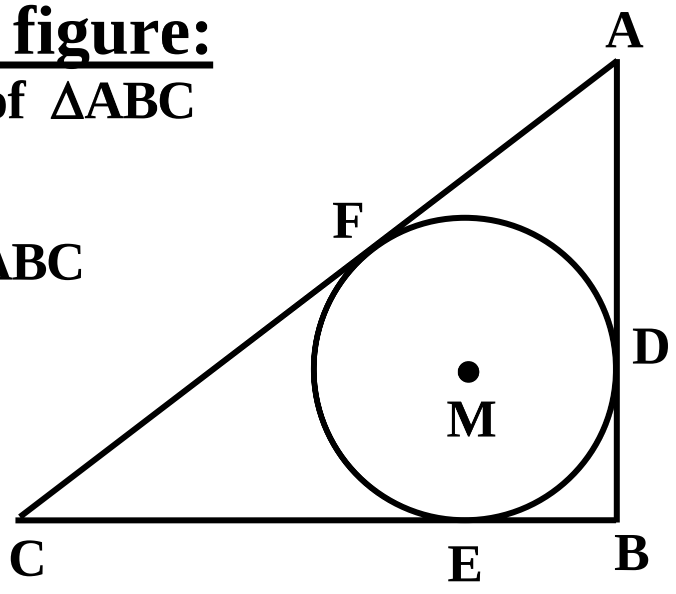
M is the inscribed circle of ΔABC

If BE = 2 cm , CE = 4 cm

And the perimeter of Δ ABC

= 22 cm , calculate the

Length of $\overline{AD}$

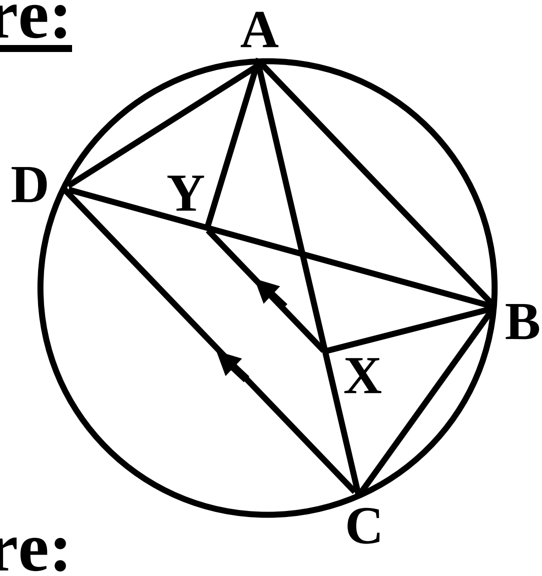


[145] In the opposite figure:

If $\overline{XY} // \overline{CD}$

Prove that:

ABXY is a cyclic quadrilateral.

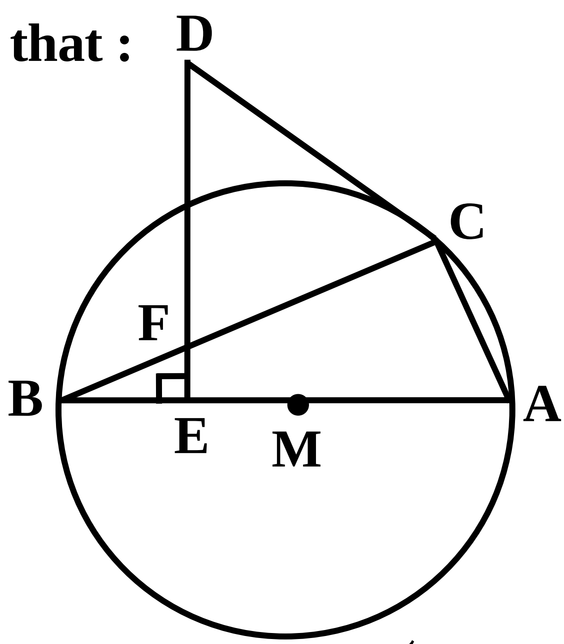


[146] In the opposite figure:

$\overline{AB}$ is a diameter of the circle M , $\overline{CD}$ touches the circle at C and $\overline{DE} \perp \overline{AB}$, prove that :

1) ACEF is a cyclic quadrilateral

2) DC = DF



[147] In the opposite figure:

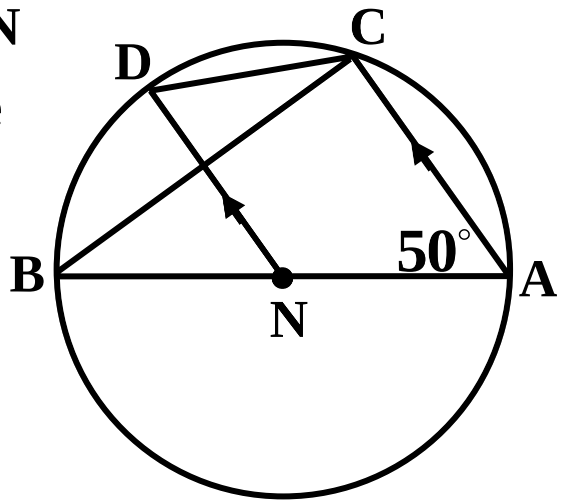
$\overline{AB}$ is a diameter in the circle N

C and D are two points on the

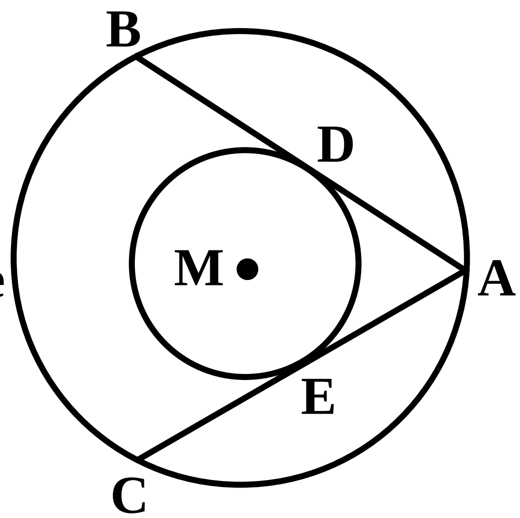
Circle where $\overline{AC} \parallel \overline{ND}$ and

$m(\angle BAC) = 50^\circ$

Calculate : $m(\angle BCD)$



[148] In the opposite figure:



There are two concentric circles M
Where A is a point on the great circle

Draw $\overrightarrow{AD}$ as a tangent to the small
Circle at D to cut the great circle

At B. draw $\overrightarrow{AE}$ as a tangent to the small circle at E to cut the great circle at C prove that: DB = EC

[149] In the opposite figure:

ABC is an inscribed triangle

In a circle and $\overleftrightarrow{DE} \parallel$ the

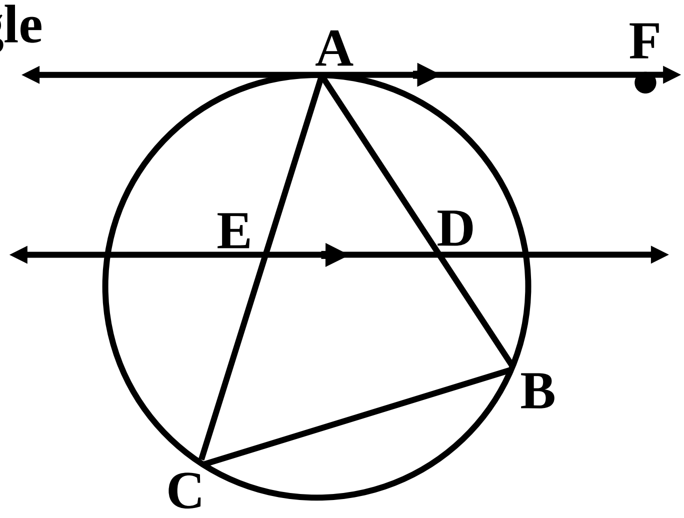
Tangent drawn to the

Circle at A and cuts $\overline{AB}$

At D and $\overline{AC}$ at E

Prove that:

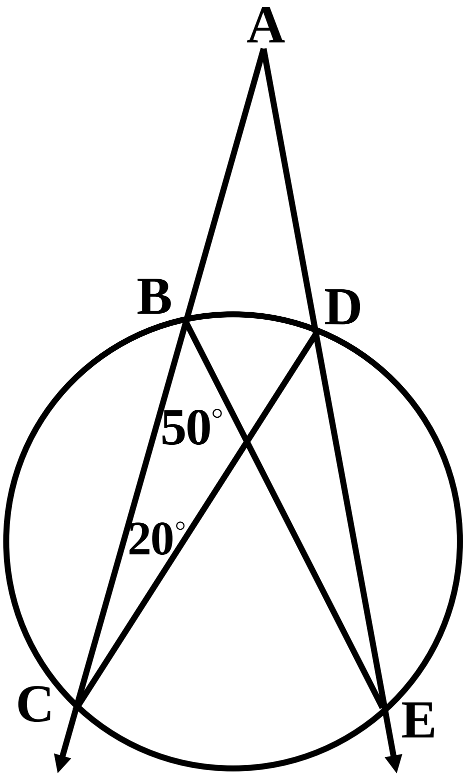
The figure DBCE is a cyclic quadrilateral



[150] In the following figure:

A is a point outside a circle , $\overrightarrow{AB}$ is drawn to cut the Circle at B and C and $\overrightarrow{AD}$ is drawn to cut the circle at D And E if $m(\angle EBC) = 50^\circ$ and $m(\angle DCB) = 20^\circ$

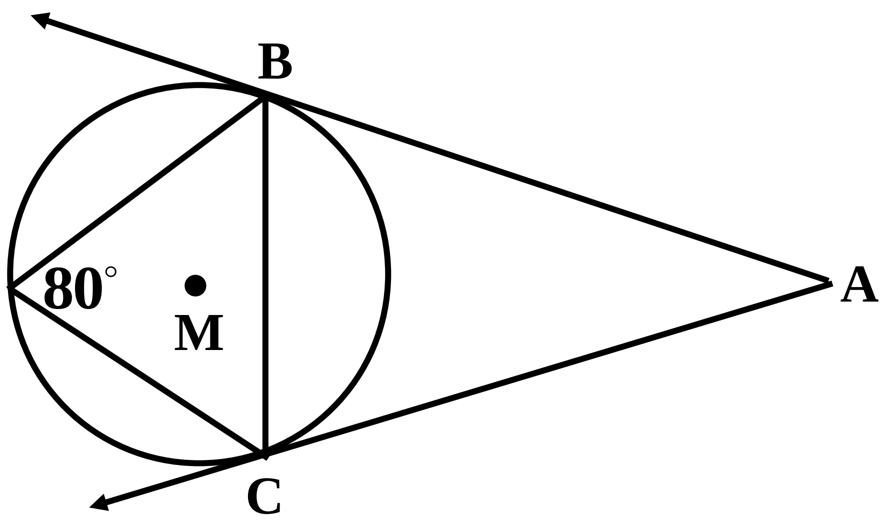
Calculate : $m(\angle EAC)$



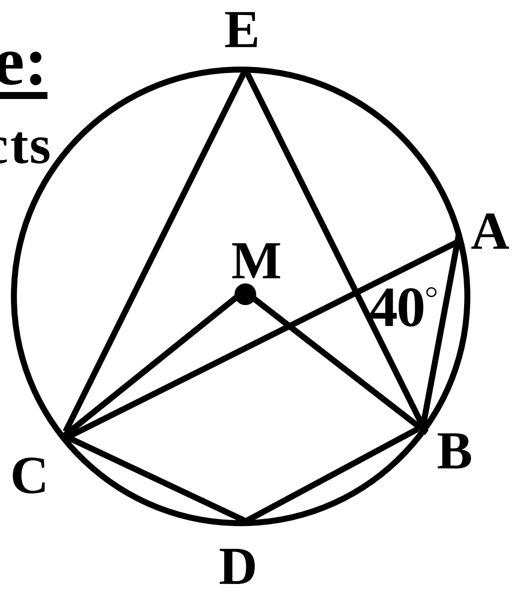
[151] In the opposite figure:

$\overrightarrow{AB}$ and $\overrightarrow{AC}$ are Two tangents to The circle M At B and C and D $m(\angle BDC) = 80^\circ$

Find : $m(\angle A)$



[152] In the opposite figure:

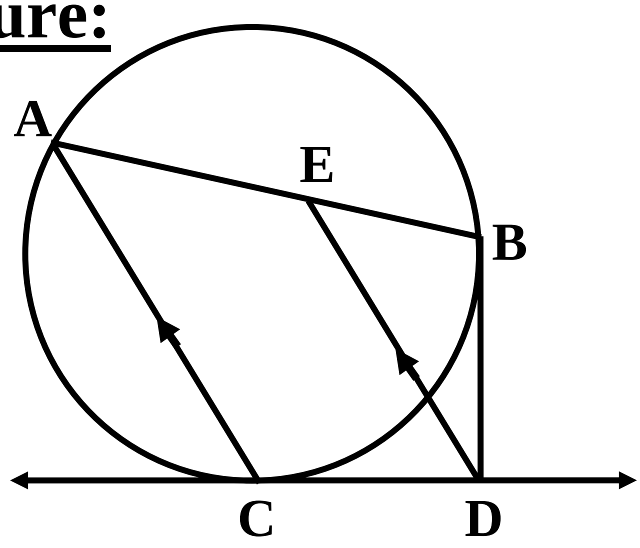


The chords $\overline{AC}$ and $\overline{BE}$ intersects At X , M is the centre of the Circle , D ∈ draw $\overline{MB}$ $\overline{MC}$ and $\overline{AB}$ if $m(\angle BAC) = 40^\circ$

Find :

1) $m(\angle BEC)$ 2) $m(\angle BMC)$ 3) m(BDC)

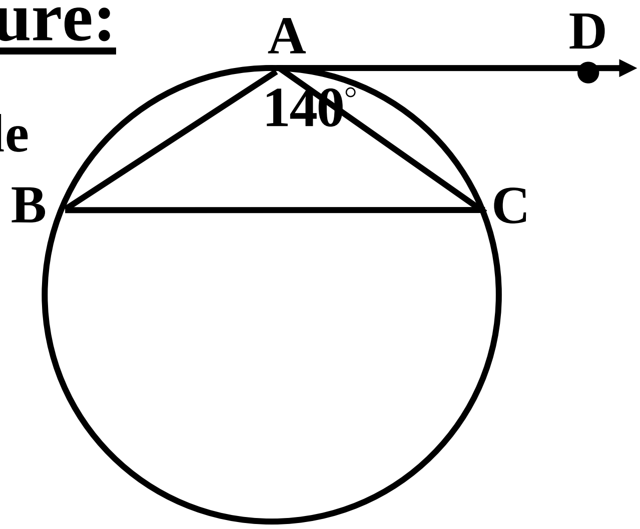
[153] In the opposite figure:



Δ ABC is inscribed in A circle. $\overline{CD}$ is a tangent To the circle at C draw $\overline{DE} // \overline{AC}$ to cut $\overline{AB}$ at E

Prove that: BECD is a cyclic quadrilateral.

[154] In the opposite figure:



If $\overrightarrow{AD}$ is a tangent to the circle At A , $m(\angle DAB) = 140^\circ$

Find : $m(\angle C)$

[155] In the opposite figure:

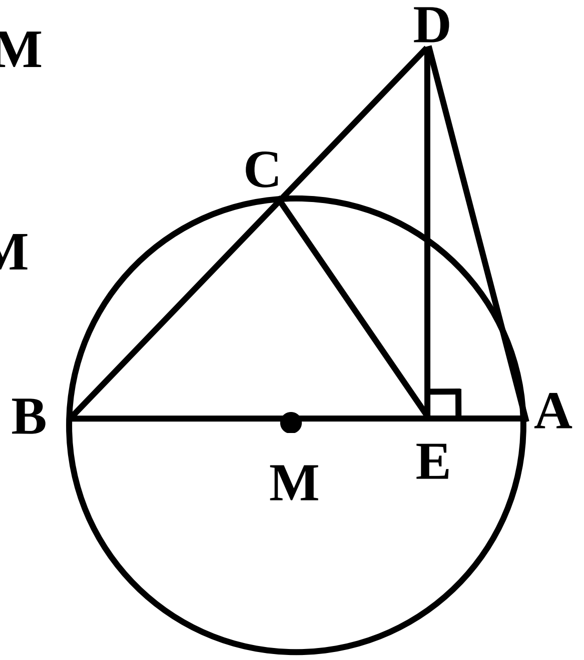
$\overline{AB}$ is a diameter in the circle M

And $E \in \overline{MA}$ draw $\overrightarrow{ED} \perp \overline{AB}$

Where D is outside the circle M

$\overline{DB}$ is drawn to cut the circle

At C



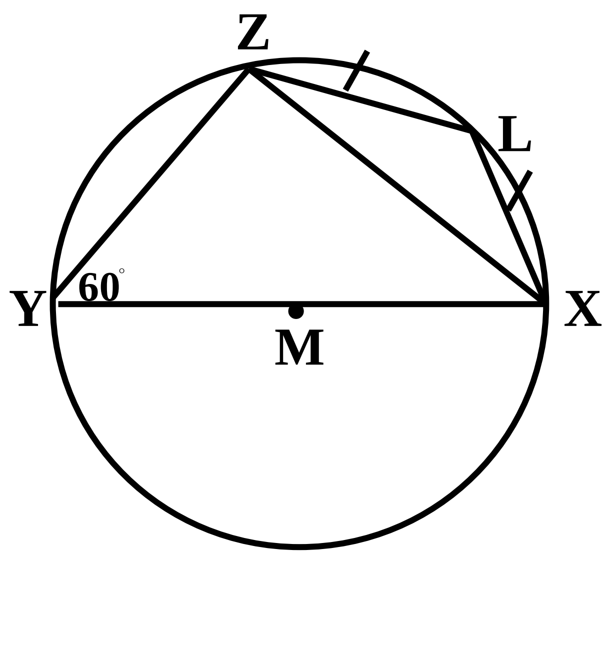
Prove that:

The figure AECD is a cyclic Quadrilateral

[156]In the opposite figure

$\overline{XY}$ is a diameter in the circle M , $m(\overset{\frown}{XL}) = m(\overset{\frown}{LZ})$ and

$m(\angle Y) = 60^\circ$, find $m(\angle L)$, $m(\angle XZY)$ and $m(\angle LXZ)$



[157]In the opposite figure

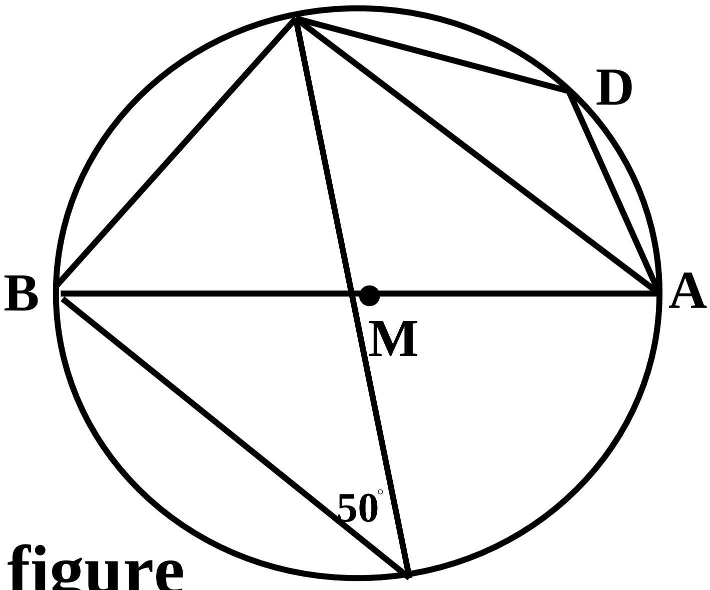
If $\overline{AB}$ is a diameter and

$m(\angle BEC) = 50^\circ$,

Then **find**

$m(\angle BAC), m(\angle ABC)$

And $m(\angle ADC)$



[158]In the opposite figure

The length of AB

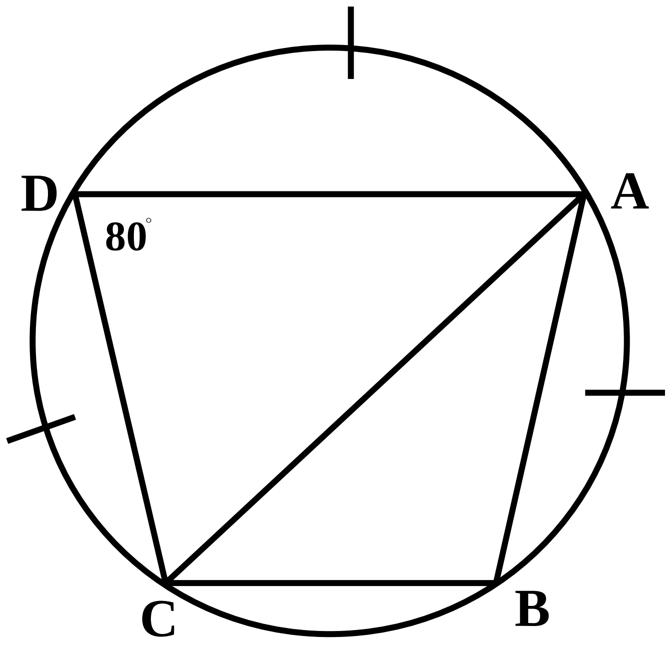
= the length of AD

= the length of DC

And $m(\angle ADC) = 80^\circ$

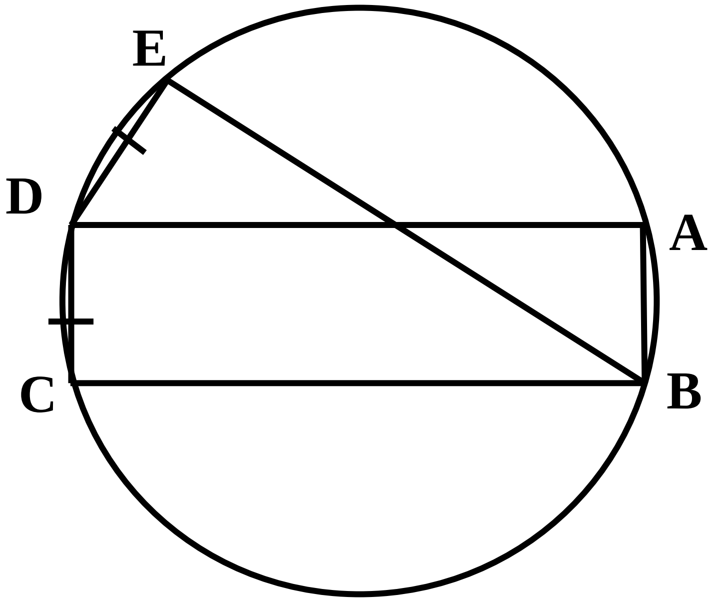
Find: $m(\angle ABC)$

And m (BC)



[159]In the opposite figure

ABCD is a rectangle inscribed In a circle and DE = DC
Prove that: AD = BE



[160]In the opposite figure

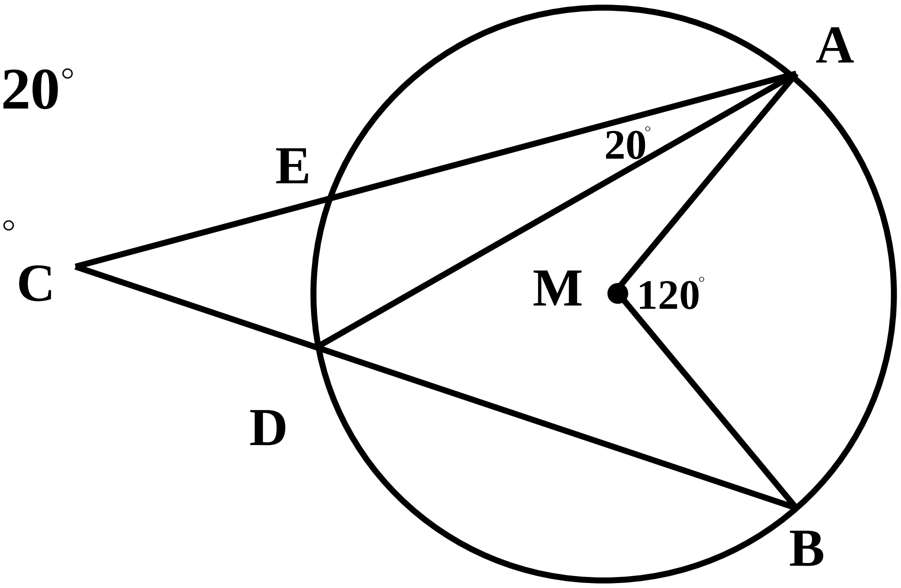
$\overrightarrow{BD} \cap \overrightarrow{AE} = \{C\}$

$, m(\angle AMB) = 120^\circ$

An

$m(\angle DAC) = 20^\circ$

Find: $m(\angle C)$



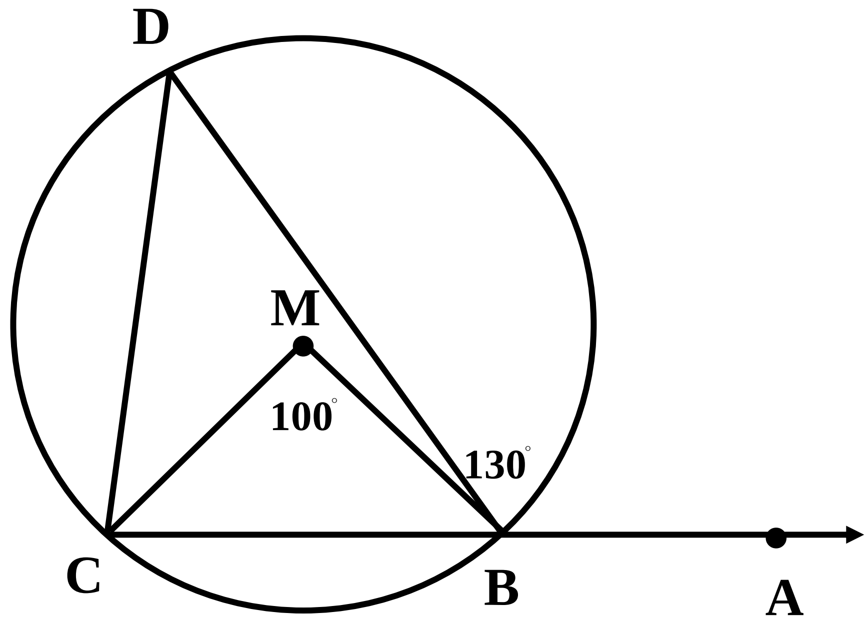
[161]In the opposite figure

$m(\angle MBC) = 100^\circ$

and

$m(\angle ABD) = 130^\circ$

Find : $m(\angle DCB)$

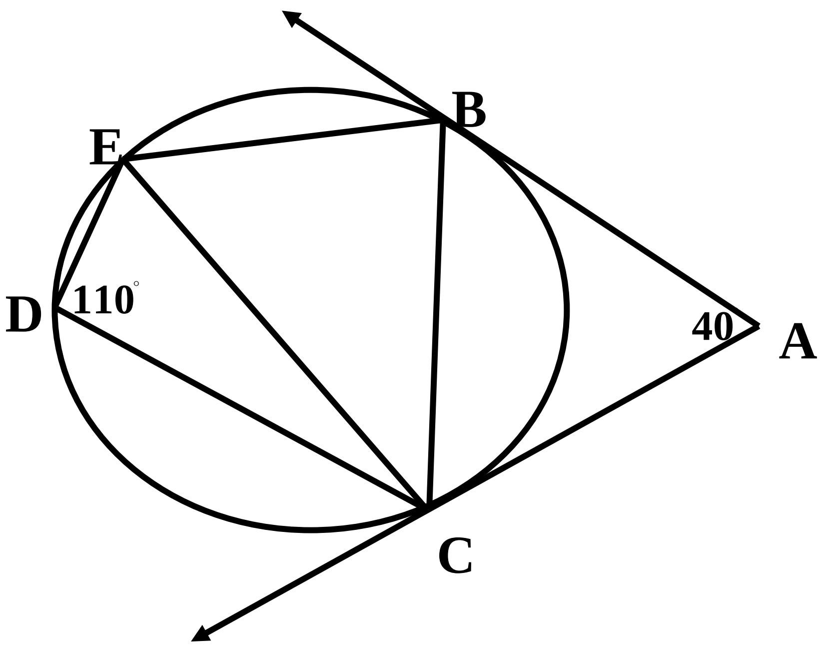


[162]In the opposite figure

$\overrightarrow{AB}$ And $\overrightarrow{AC}$ are two tangents to a circle at B and C

$m(\angle BAC) = 40^\circ$ and $m(\angle CDE) = 110^\circ$

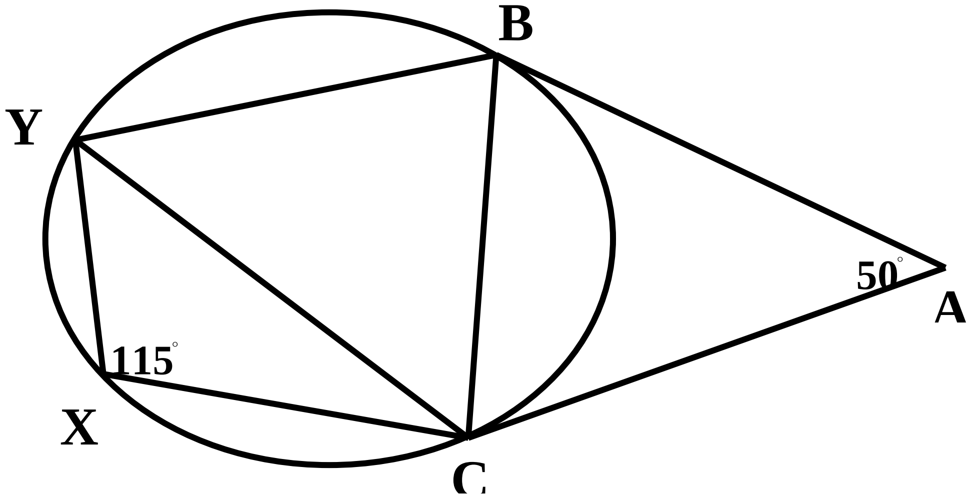
Prove that 1) $CB = CE$ 2) $\overline{BE} // \overline{AC}$



[163]In the opposite figure

$\overline{AB}$ And $\overline{AC}$ are two tangents to a circle at B and C $m(\angle A) = 50^\circ$ and $m(\angle CXY) = 115^\circ$ Prove that

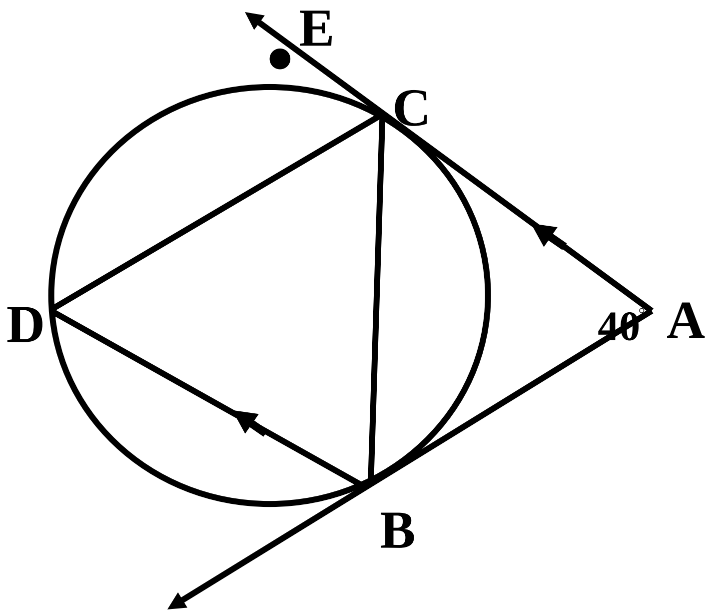
1) $\overrightarrow{BC}$ bisects $\angle ABY$ 2) $CB = CY$



[164]In the opposite figure

$\overrightarrow{AB}$ And $\overrightarrow{AC}$ are two tangents to the circle at B and C

$\overrightarrow{AC} // \overline{BD}$ and $m(\angle A) = 40^\circ$ 1)Find $m(\angle ACB)$, $m(\angle ECD)$ 2) Prove that , $CB = CD$



[165] In the opposite figure

$m(\angle BCE) = 60^\circ$

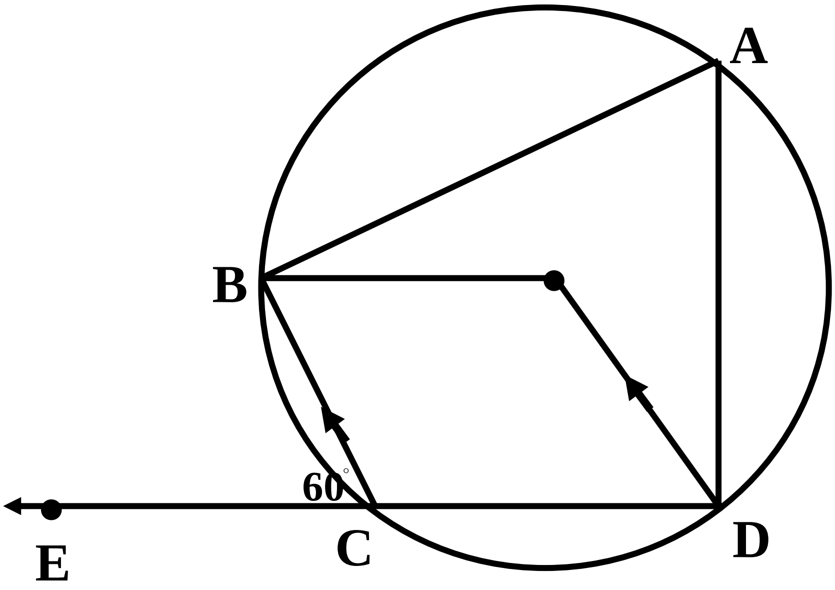
$\overline{BC} // \overline{MD}$

And A is the midpoint of BD the major

Prove that

1) The figure BMDC is A rhombus

2) $\overline{AC}$ is a diameter of the circle

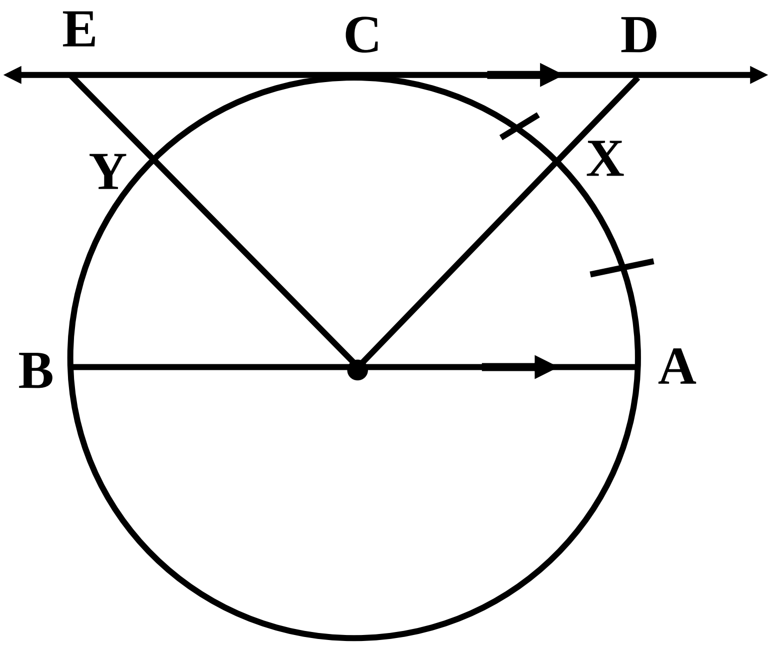


[166]In the opposite figure

$\overline{AB}$ Is a diameter of the circle M, $\overleftrightarrow{DE}$ is a tangent to it at C,

$\overline{AB} // \overleftrightarrow{DE}$, X is the midpoint of $\overset{\frown}{AC}$ and $m\left(\overset{\frown}{CX}\right) = 2m\left(\overset{\frown}{CY}\right)$

Find The measure of the angles of the triangle MDE



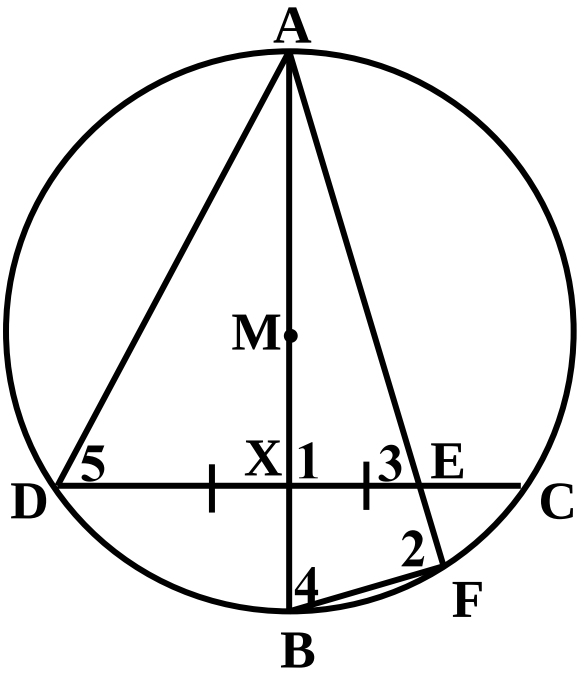
[167]In the opposite figure

$\overline{CD}$ Is a chord of the circle M, X is the midpoint of $\overline{CD}$ and $E \in \overline{CX}$

Prove that

1) EFBX is a cyclic quadrilateral

2) $m(\angle AEX) = m(\angle ADF)$



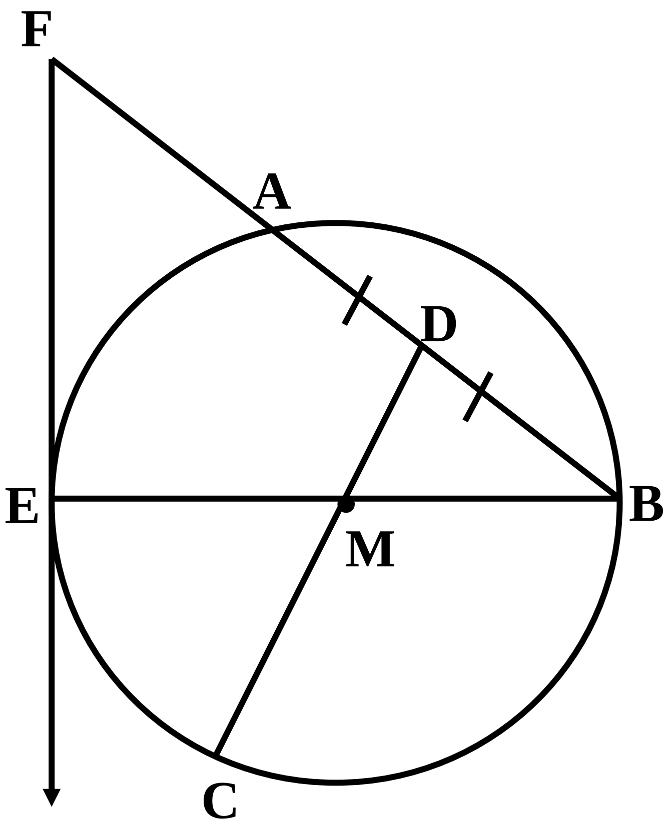
[168] in the opposite figure

$\overline{BE}$ Is a diameter of the circle M, D is the midpoint of $\overline{AB}$ and $\overrightarrow{FE}$ is a tangent to the circle M at E

Prove that

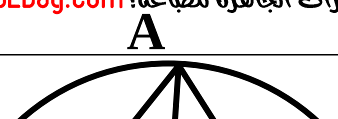
1) FDME is a cyclic quadrilateral

2) $m(\angle F) = 2m(\angle CBE)$



[169] In the opposite figure:

ABC is inscribed triangle in a circle,



$\overline{AX} \perp \overline{AB}$ Cuts it at D and $\overline{CY} \perp \overline{AB}$
Cuts it at E

Prove that:

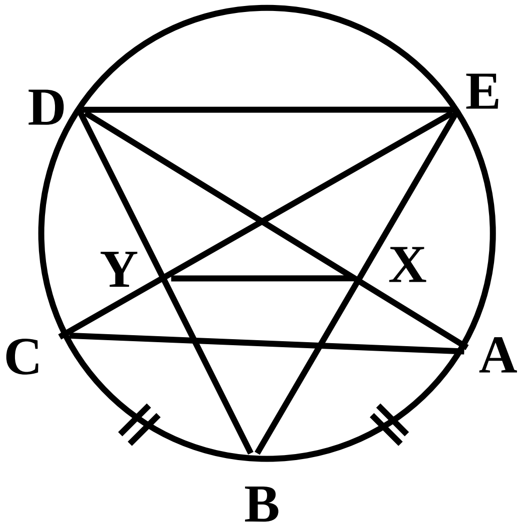
$\overline{XY} \parallel \overline{DE}$

[170] In the opposite figure:

$m(\overset{\frown}{AB}) = m(\overset{\frown}{BC})$

Prove that:

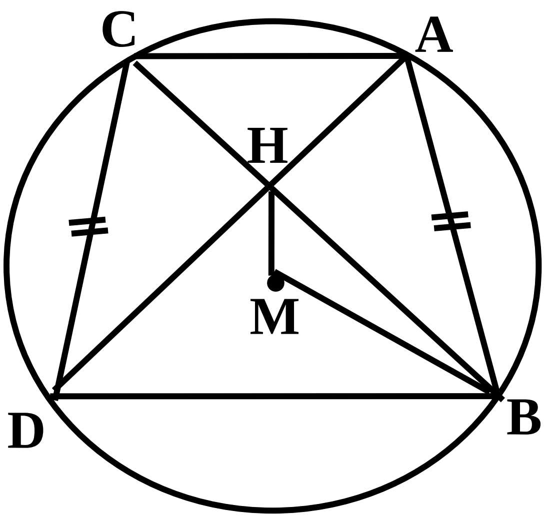
1) The figure EXYD is A cyclic quadrilateral
2) $m(\angle CAD) = m(\angle YXD)$



[171] $\overline{AB}$, $\overline{CD}$ Are chords in A circle M, AB = CD $\overline{AD} \cap \overline{BC} = \{H\}$,

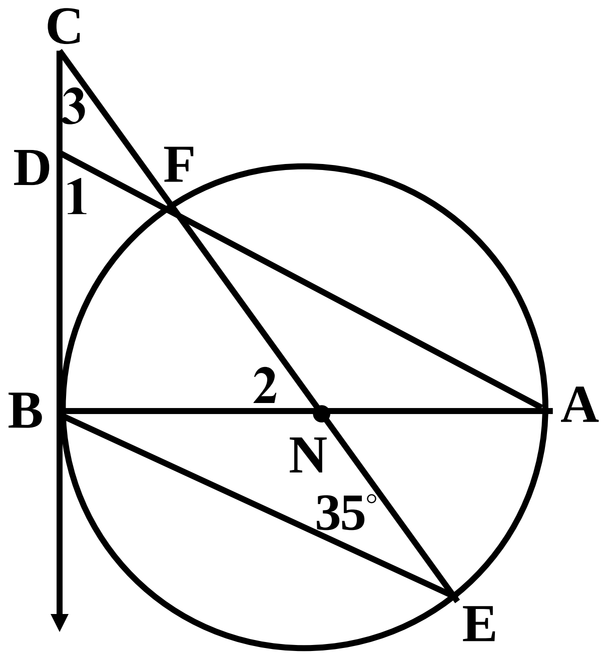
Prove that:

1) $m(\angle CAD) = m(\angle BDA)$
2) AHMB is a cyclic quad.



[172] **In the opposite figure:**

$\overline{AB}$ is a diameter of a circle with Centre N, $\overrightarrow{CB}$ is a tangent to the circle at B, $\overrightarrow{CN}$ Cuts the circle at F and E and $\overrightarrow{AF}$ Cuts $\overrightarrow{CB}$ at D If $m(\angle E) = 35^\circ$



Find:

1) $m(\angle 1)$ 2) $m(\angle 2)$

3) $m(\angle 3)$

[173] In the opposite figure

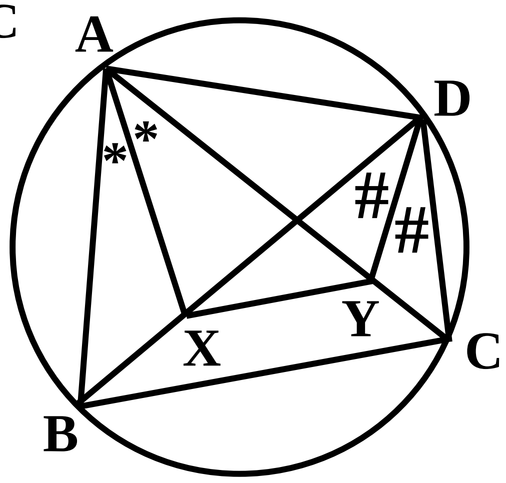
ABCD is a cyclic quadrilateral

$\overline{AX}$ bisects $\angle BAC$, $\overline{DY}$ bisects $\angle BDC$

Prove that :

1) AXYD is a cyclic quad.

2) $\overline{XY}$ // $\overline{BC}$



[174] In the opposite figure

$\overrightarrow{AB}$ is a tangent to the circle

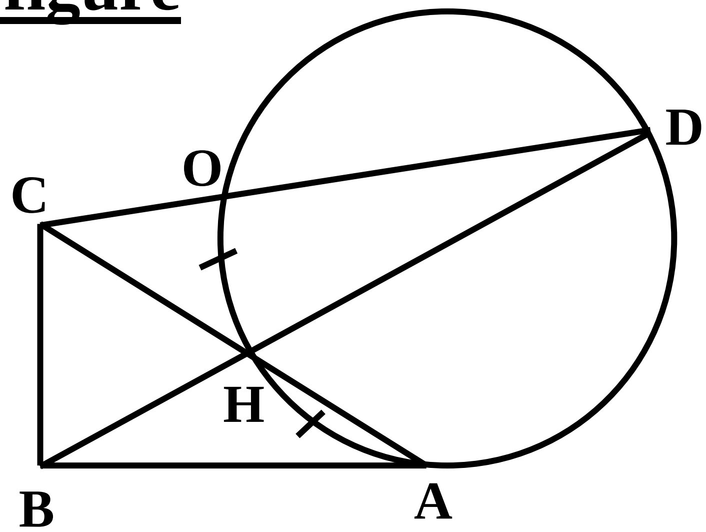
$m(\overset{\frown}{AH}) = m(\overset{\frown}{HO})$

$\overrightarrow{AH} \cap \overrightarrow{DO} = \{C\}$

Prove that :

1) ABCD is a cyclic quad.

2) $\overleftrightarrow{BC}$ is a tangent to the Circumference of Δ DHC

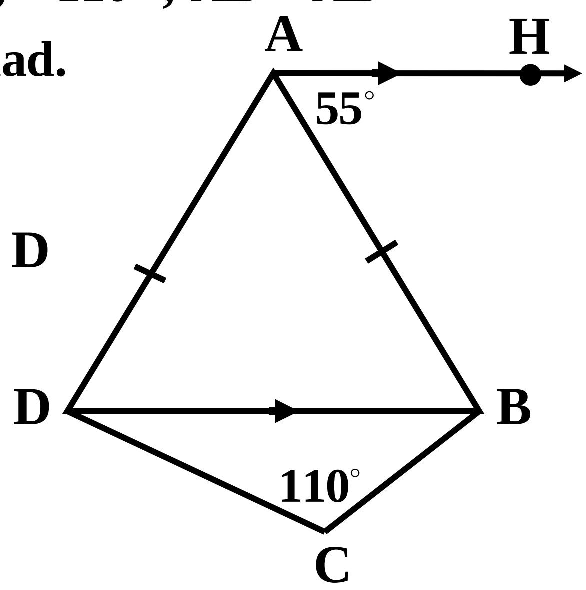


[175] In the opposite figure

$\overrightarrow{AH} // \overline{DB}$, $m(\angle BAH) = 55^\circ$ $m(\angle C) = 110^\circ$, AB = AD

Prove that : 1) ABCD is a cyclic quad.

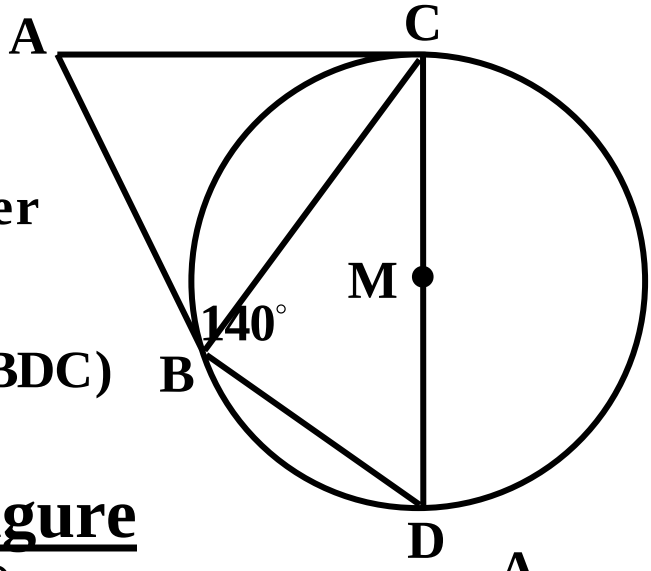
2) $\overrightarrow{AH}$ is a tangent to the circle Passing through A, B , C and D



[176] In the opposite figure

$\overline{AB}$ and $\overline{AC}$ are two Tangent – segments to A circle M , $\overline{CD}$ is a diameter in it $m(\angle ABD) = 140^\circ$

Find : 1) $m(\angle BAC)$ 2) $m(\angle BDC)$



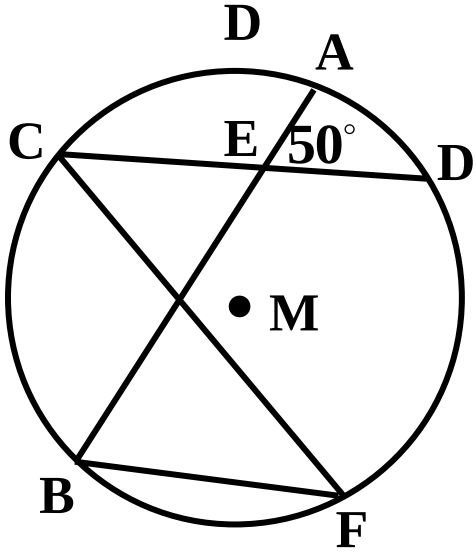
[177] In the opposite figure

M is a circle, $\overline{AB} \cap \overline{DC} = \{E\}$

$m(\angle AED) = 50^\circ$ and $m\left(\overset{\frown}{AD}\right) = 30^\circ$

Find: 1) $m\left(\overset{\frown}{CB}\right)$

2) $m(\angle F)$



[178] In the opposite figure

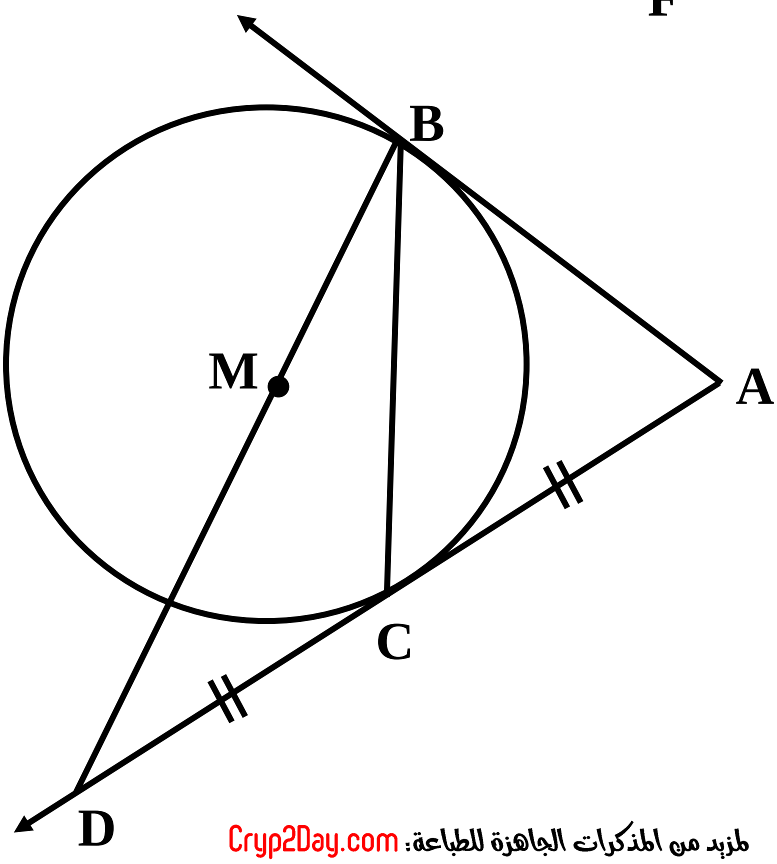
$\overrightarrow{AB}$ and $\overrightarrow{AC}$ touch the Circle at B and C and

$\overrightarrow{AB} \cap \overrightarrow{AC} = \{D\}$

If C is the Midpoint of $\overline{AD}$

Prove that :

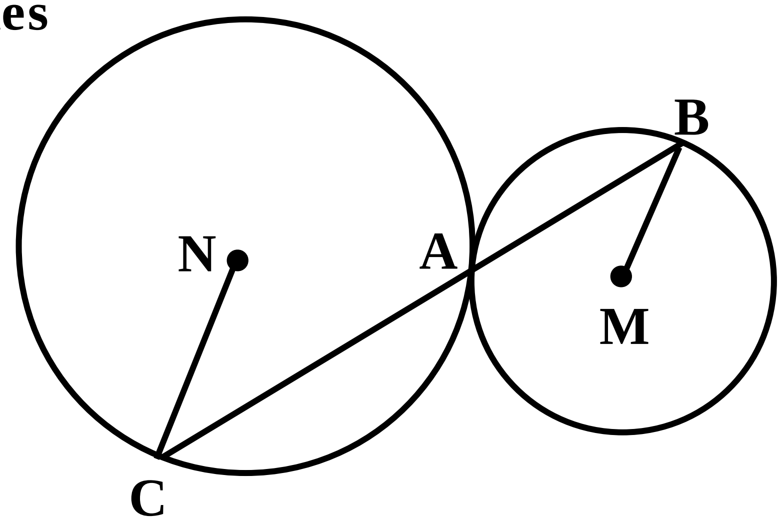
Δ ABC is equilateral.



[179] In the opposite figure

M and N are two circles touching externally at A , $\overleftrightarrow{AB}$ cuts the circle M at B and the circle N at C

Prove that: $\overline{MB} // \overline{NC}$



[180] In the opposite figure

BCHD is a cyclic quadrilateral

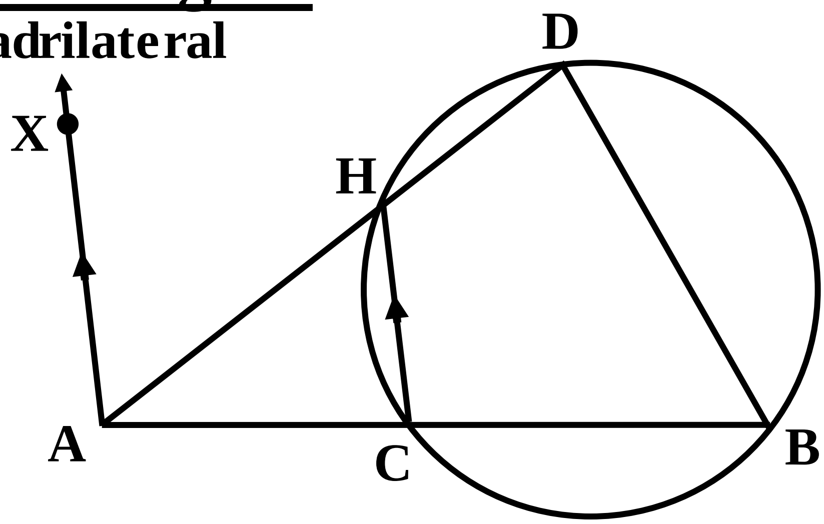
$\overrightarrow{DH} \cap \overrightarrow{BC} = \{A\}$

$\overrightarrow{AX} // \overline{CH}$

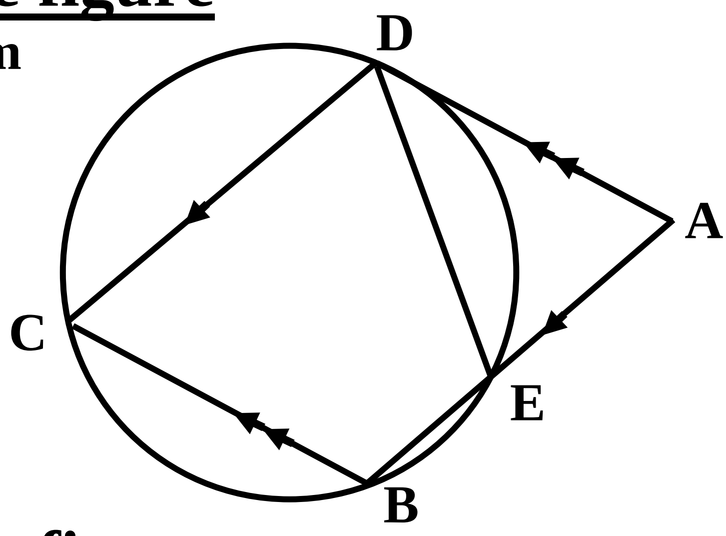
Prove that :

$\overleftrightarrow{AX}$ is a tangent to

The circle passing through the vertices of the triangle ABD



[181] In the opposite figure



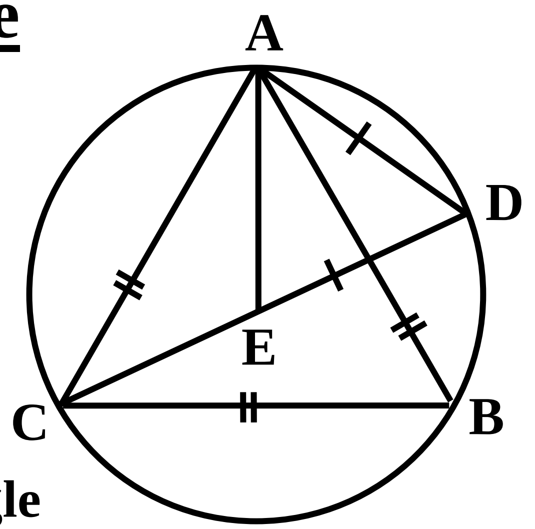
ABCD is a parallelogram

1) Prove that : AD = ED

2) If $m(\angle B) = 110^\circ$

Find : $m(\angle ADE)$

[182] In the opposite figure



ABC is an equilateral triangle

Inscribed in a circle $D \in AB$

The point $E \in DC$

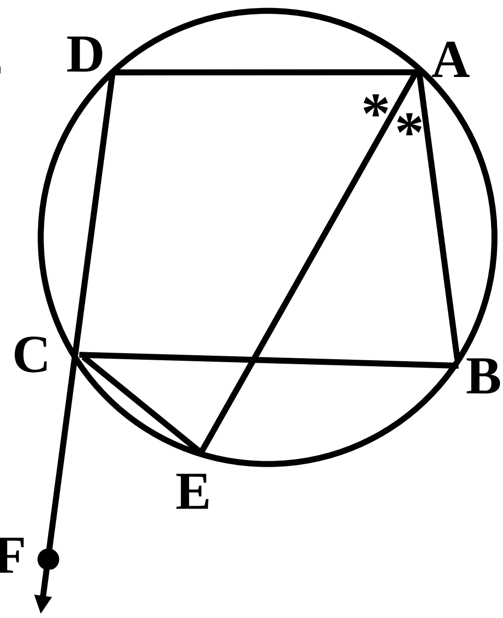
Where AD = DE

Prove that :

1) Δ ADE is an equilateral triangle

2) DB = CE

[183] In the opposite figure



ABCD is a cyclic quadrilateral

$F \in \overrightarrow{DC}$ and $\overrightarrow{AE}$ bisects $\angle BAD$

Prove that :

$\overrightarrow{CE}$ bisects $\angle BCF$

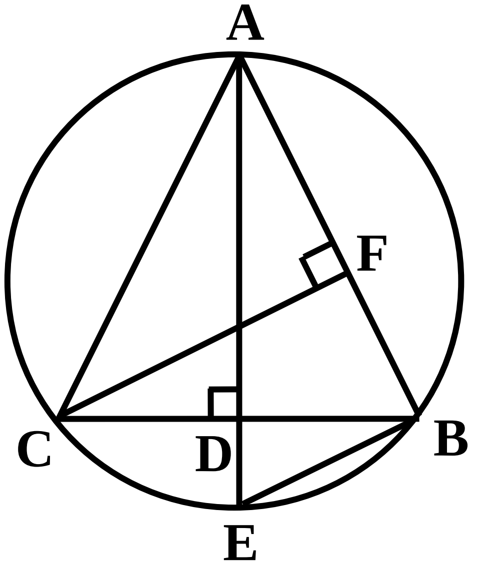
[184] In the opposite figure

ABC is an acute – angled triangle Inscribed in a circle. draw $\overrightarrow{CF} \perp \overline{AB}$ to cut $\overline{AB}$ at F

Prove that :

1) AFDC is a cyclic quadrilateral

2) $m(\angle BFD) = m(\angle BED)$

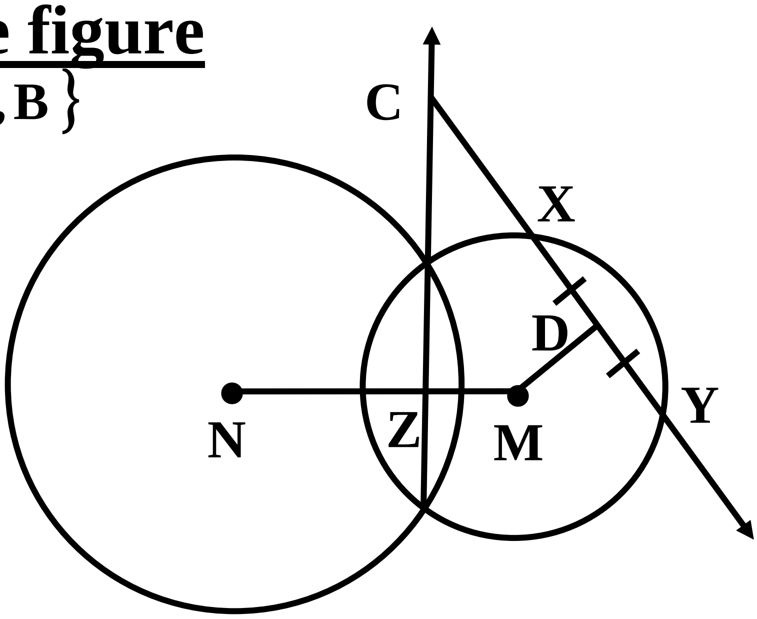


[185] In the opposite figure

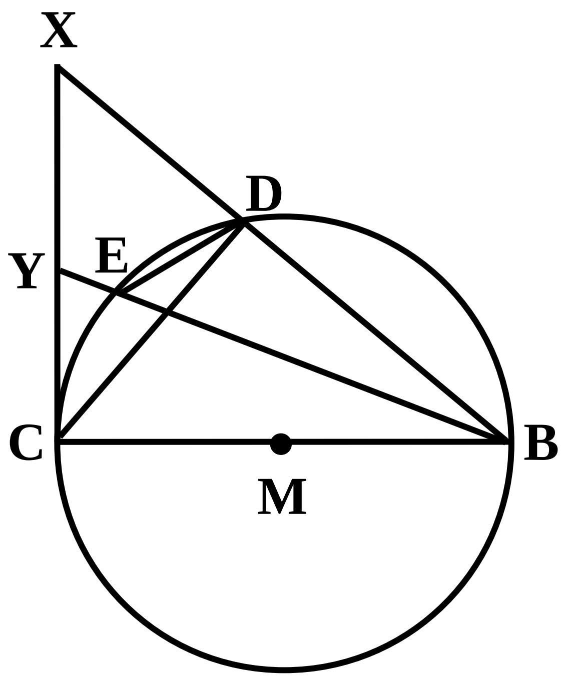
Circle M $\cap$ circle N $= \{A, B\}$

$C \in \overrightarrow{BA}$ and $C \notin \overline{BA}$ draw $\overrightarrow{CX}$ to cut circle M at X And Y if D is the Midpoint of $\overline{XY}$ and $\overline{AB} \cap \overline{MN} = \{Z\}$

Prove that : CDMZ is a cyclic quadrilateral.



[186] In the opposite figure



$\overline{BC}$ is a diameter of a circle

$\overline{BD}$ and $\overline{BE}$ are two chords of

It and on one side of $\overline{BC}$, from

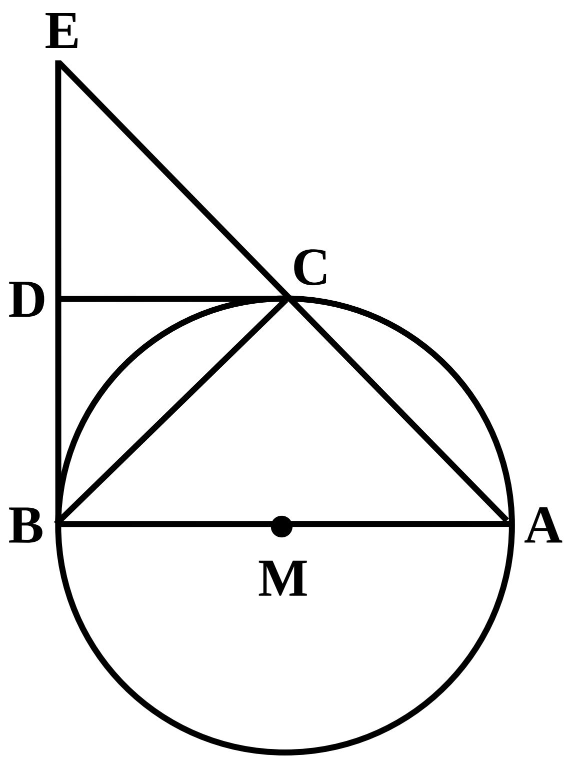
C a tangent is drawn to the circle

Cutting $\overrightarrow{BD}$ at X and $\overrightarrow{BE}$ at Y

Prove that :

DEYX is a cyclic quadrilateral.

[187] In the opposite figure



$\overline{AB}$ is a diameter of a circle

$\overrightarrow{DB}$ and $\overrightarrow{DC}$ are tangents to

the circle at B and C prove that

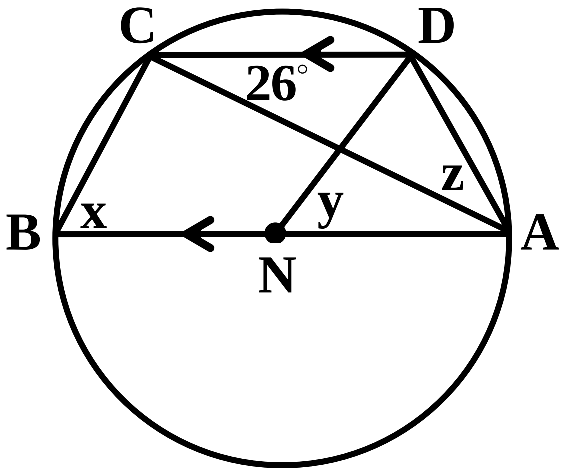
: D is the midpoint of $\overline{BE}$

[188] In the following figure:

ABCD is a quadrilateral inscribed in a circle with centre N. $\overline{AB} // \overline{CD}$

Find the values of x , y , z

If $m(\angle ACD) = 26^\circ$

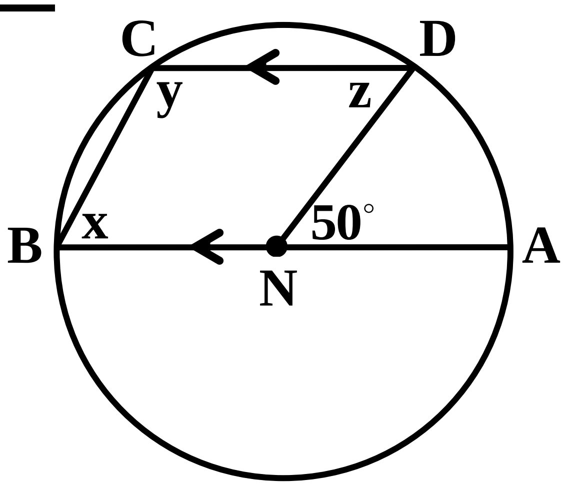


[189] In the following figure:

ABCD is a quadrilateral inscribed in a circle with centre N. $\overline{AB} // \overline{CD}$

Find the values of x , y , z

If $m(\angle DNA) = 50^\circ$

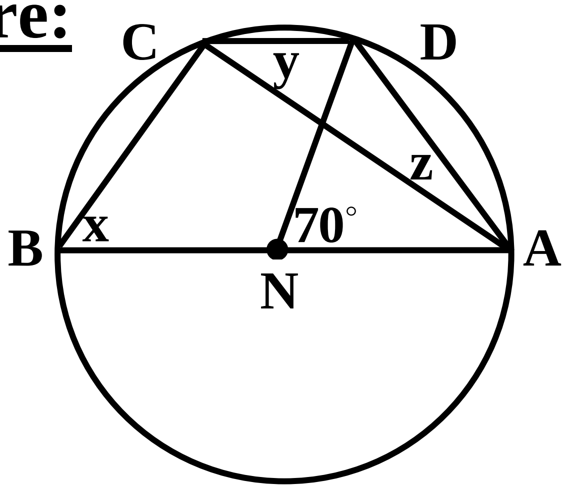


[190] In the following figure:

ABCD is a quadrilateral inscribed in a circle with centre N. $\overline{AB} // \overline{CD}$

Find the values of x , y , z

If $m(\angle DNA) = 70^\circ$

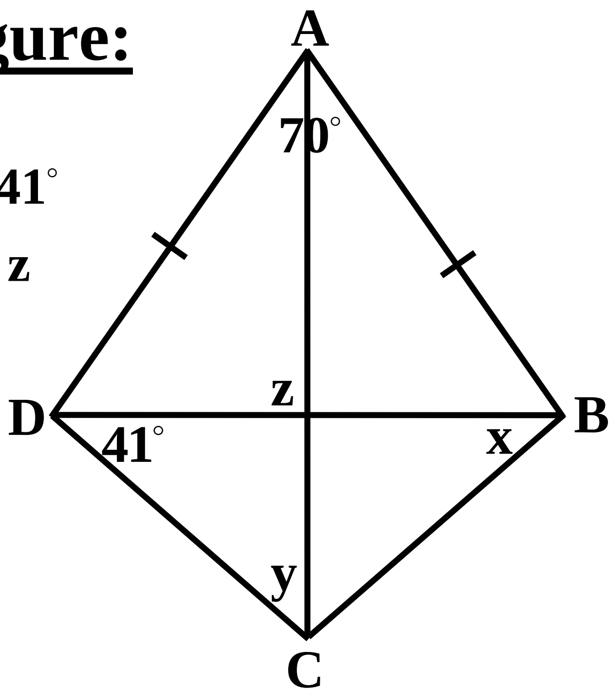


[191] In the following figure:

ABCD is a cyclic quadrilateral

in which $AB = AD$, $m(\angle BDC) = 41^\circ$

find the value of each of x, y and z



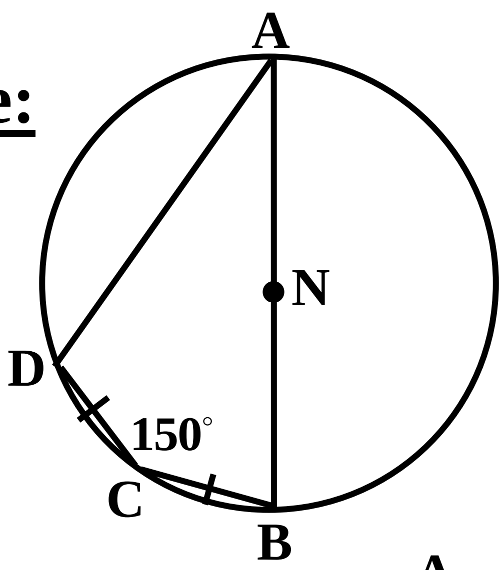
[192] In the following figure:

ABCD is a cyclic quadrilateral

in a circle with centre N, $CB = CD$

$m(\angle C) = 150^\circ$. Find $m(\angle A)$, $m(\angle B)$

and $m(\angle D)$

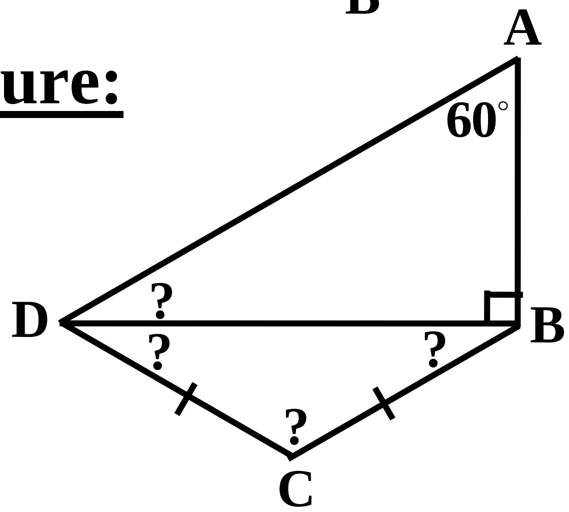


[193] In the following figure:

ABCD is a cyclic quadrilateral

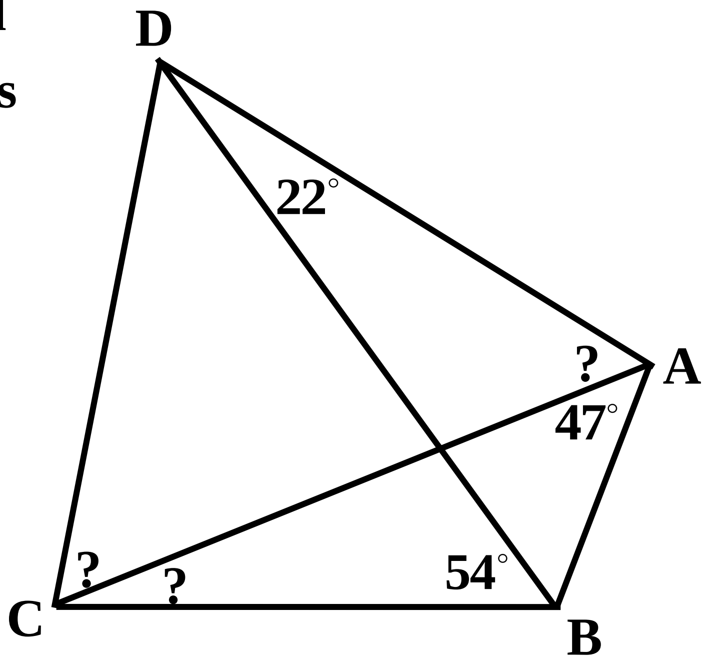
find the measures of the angles

labled by the sign (?)



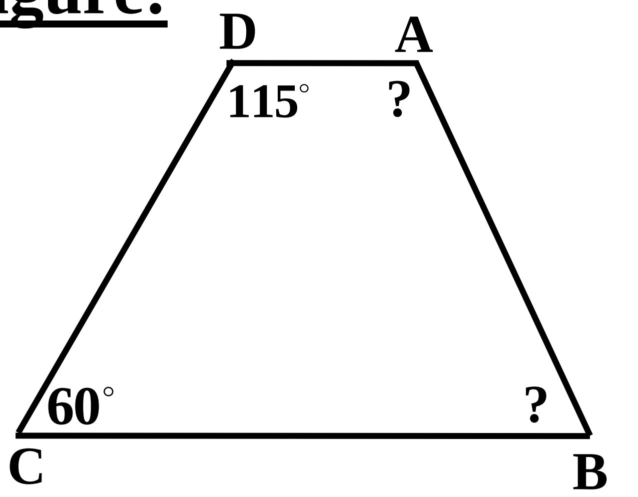
[194] In the following figure:

ABCD is a cyclic quadrilateral find the measures of the angles labled by the sign (?)



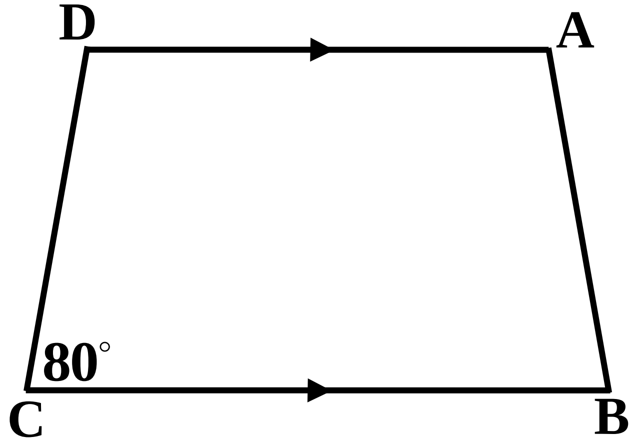
[195] In the following figure:

ABCD is a cyclic quadrilateral find the measures of the angles labled by the sign (?)



[196] In the following figure:

ABCD is a cyclic quadrilateral find the measures of the angles labled by the sign (?)



[197] In the following figure:

$\overline{AB}$ is a diameter of the circle

$m(\overset{\frown}{BC}) = m(\overset{\frown}{BD})$, $\overrightarrow{DE}$ touches

the circle at D and intersect $\overrightarrow{AB}$

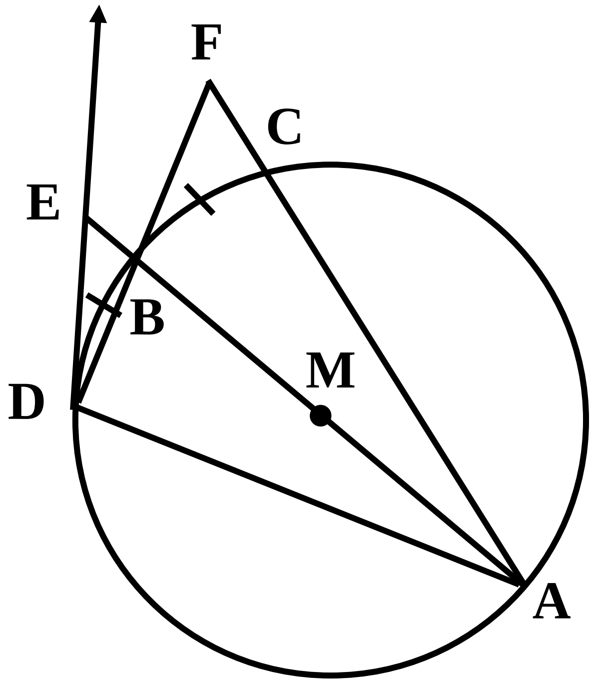
at E. if $\overrightarrow{DB} \cap \overrightarrow{AC} = \{F\}$

prove that:

a) ADEF is a cyclic quadrilateral

b) $\overline{FE} \perp \overline{AE}$

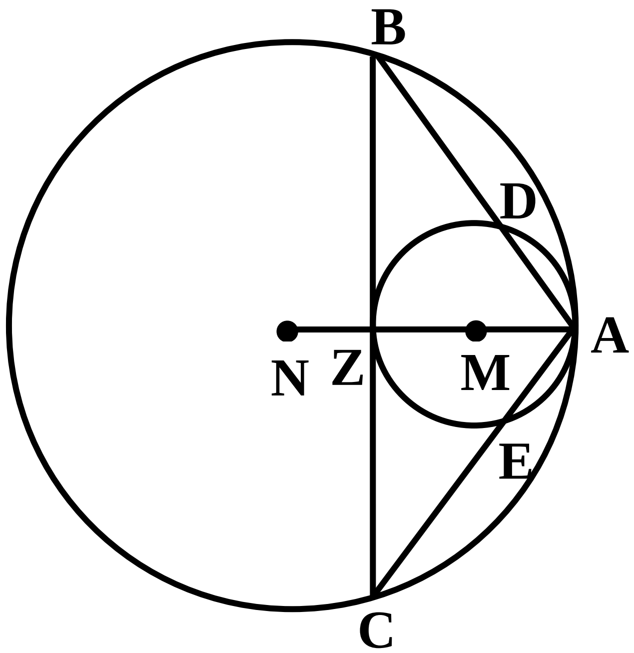
c) CBEF is a cyclic quadrilateral



[198] In the following figure:

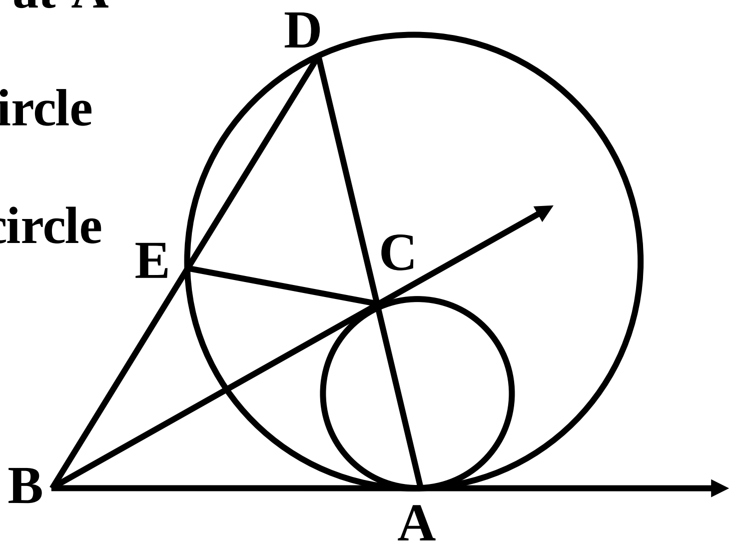
Two circlers N , M touch internally at A , $\overline{BC}$ is a chord of the larger circle and touches the smaller circle at Z where Z $\in$ $\overline{AN}$, $\overline{AB}$ intersects the smaller circle at D and intersects it at E prove that:

a) $\overline{DE} // \overline{BC}$ b) AB = AC



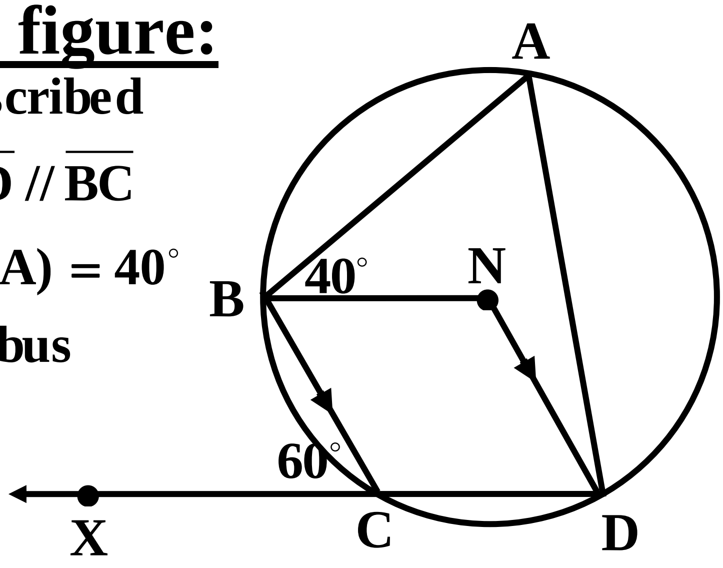
[199] In the opposite figure:

Two circles touch internally at A $\overrightarrow{BA}$, $\overrightarrow{BC}$ touch the smaller circle at A , C. $\overrightarrow{AC}$ cuts the larger circle at D and $\overline{DB}$ cuts the larger circle at E. Prove that ABEC is a cyclic quadrilateral



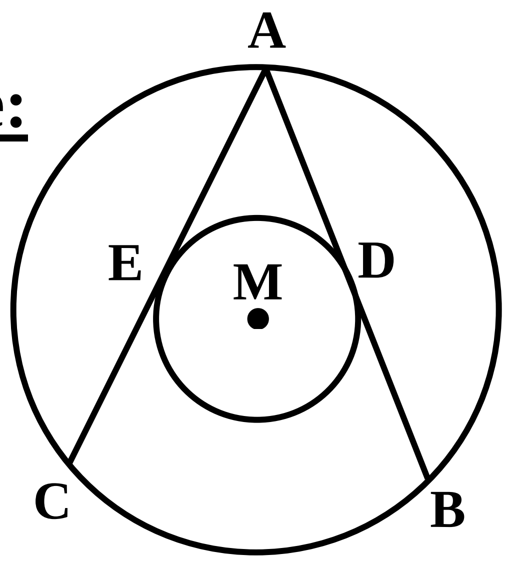
[200] In the opposite figure:

ABCD is a quadrilateral inscribed in a circle with centre N , $\overline{ND}$ // $\overline{BC}$ if $m(\angle BCX) = 60^\circ$, $m(\angle NBA) = 40^\circ$ Prove that NDCB is a rhombus then find $m(\angle ADN)$



[201] In the opposite figure:

Two circles have the same centre M $A \in$ the larger circle. $\overline{AB}$, $\overline{AC}$ touch the smaller circle at D , E Prove that AB = AC

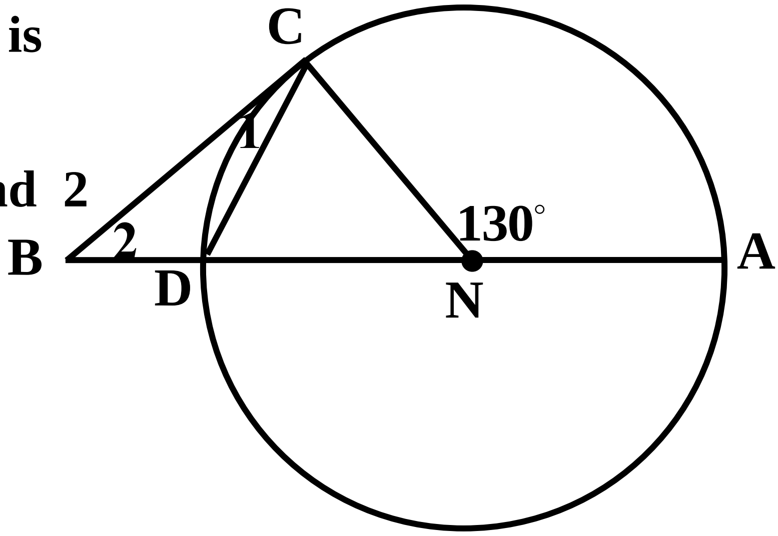


[202] In the opposite figure:

N is the centre of the circle

$\overline{AD}$ is a diameter of it. $\overline{BC}$ is a tangent-segment.

find the value of each 1 and 2

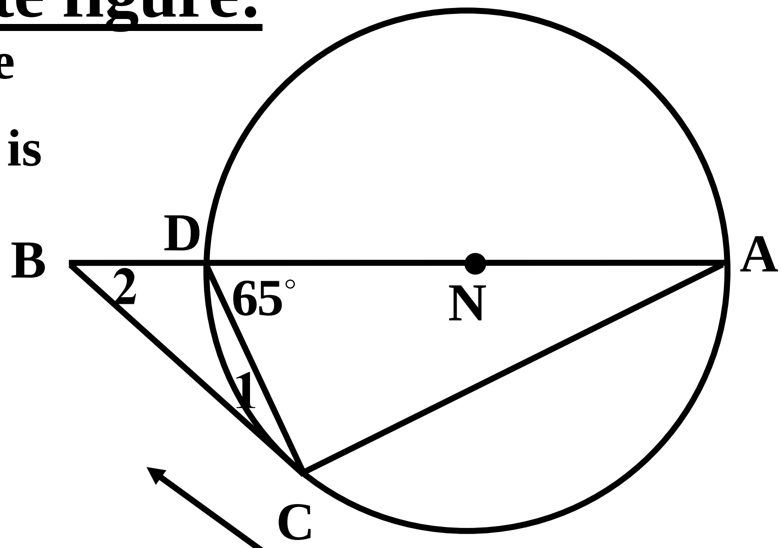


[203] In the opposite figure:

N is the centre of the circle

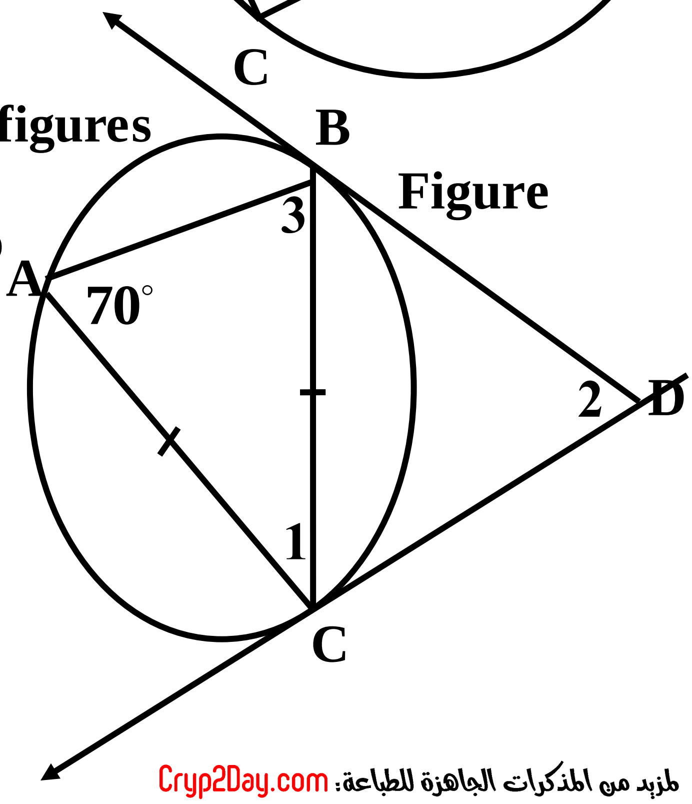
$\overline{AD}$ is a diameter of it. $\overline{BC}$ is a tangent - segment.

find the value of each 1 and 2



[204]

In each of the the following figures $\overrightarrow{DB}$, $\overrightarrow{DC}$ are two tangents to the circle. find the value of each of 1 , 2 and 3



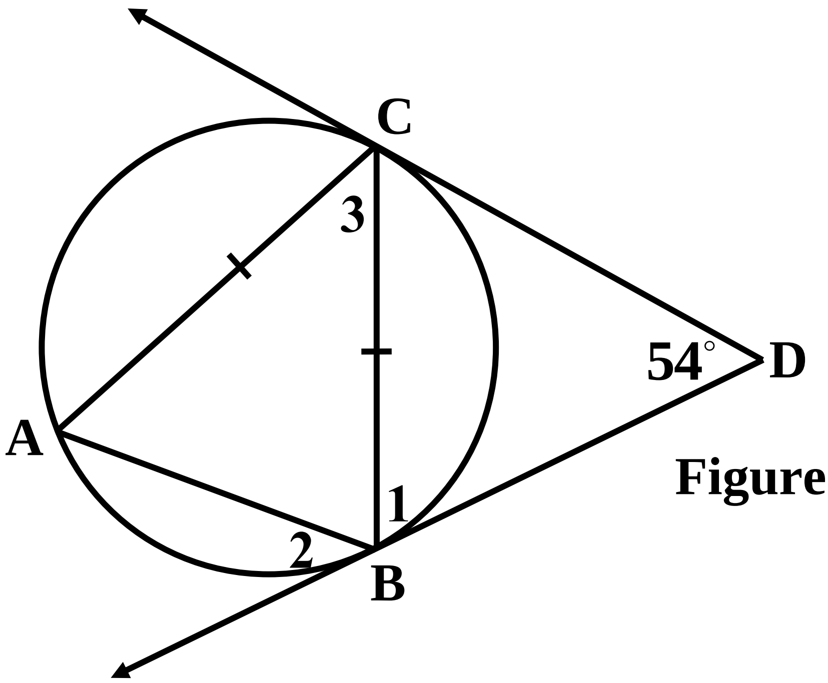
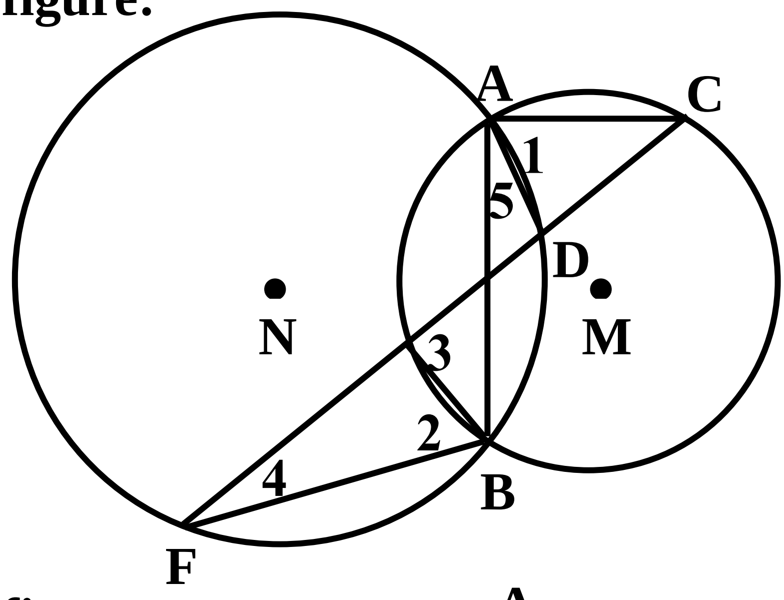


Figure (2)

[205] **In the opposite figure:**

Prove that :

$m(\angle 1) = m(\angle 2)$

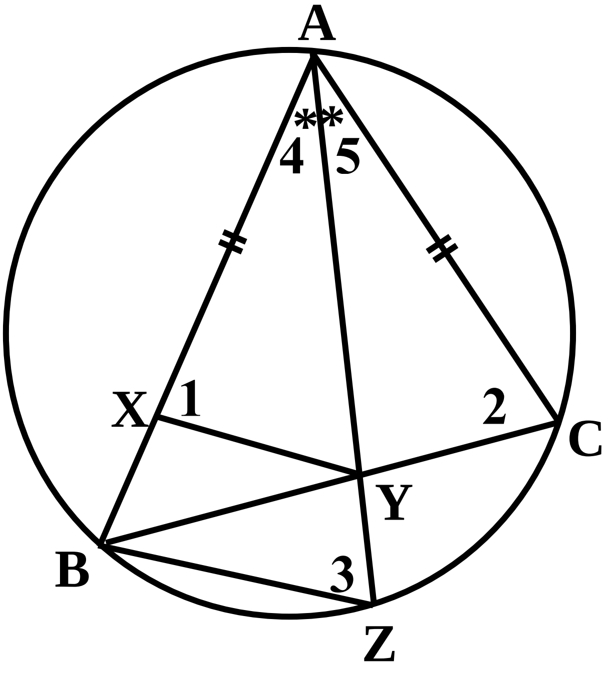


[206] **In the opposite figure:**

$AC = AX$, $m(\angle 4) = m(\angle 5)$

Prove that :

BXYZ is a cyclic quadrilateral

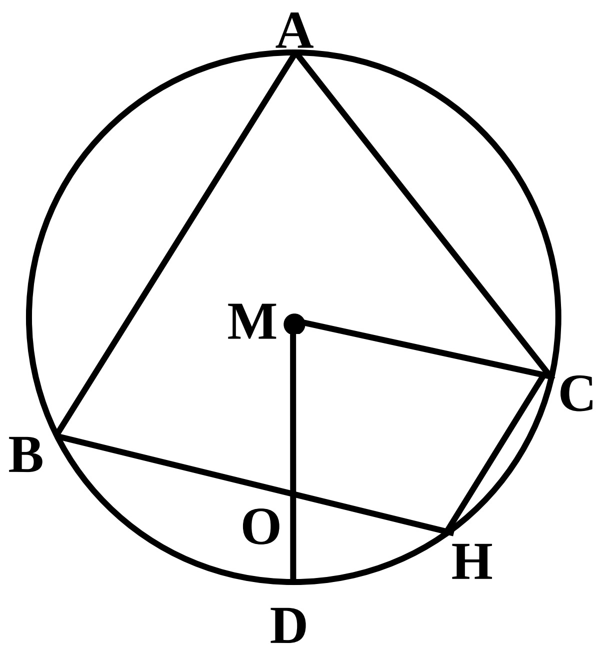


[207] In the opposite figure:

D is the midpoint of BC ,

$\overline{MD} \cap \overline{BH} = \{O\}$

Prove that : MCHO is a cyclic quadrilateral

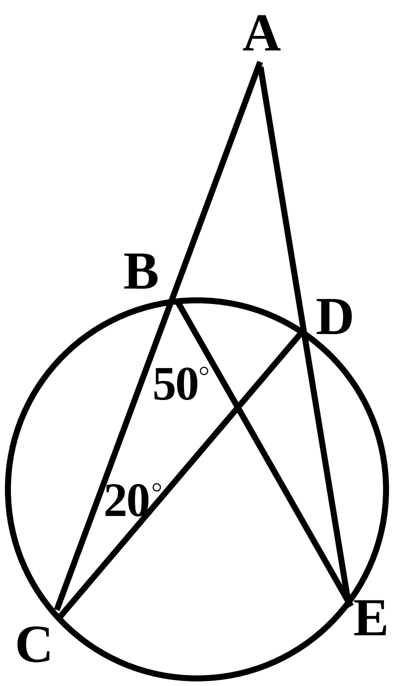


[208] In the opposite figure:

A is a point outside a circle. $\overrightarrow{AB}$ is Drawn to cut the circle at B and C

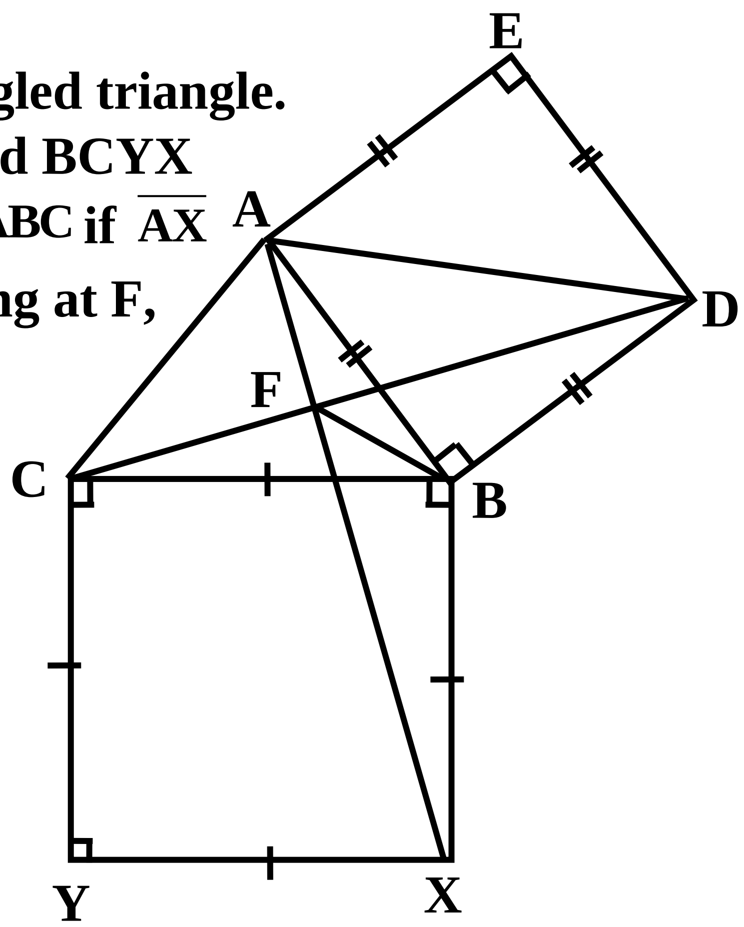
$\overrightarrow{AD}$ is drawn to cut the circle at D and E if $m(\angle EBC) = 50^\circ$ and $m(\angle DCB) = 20^\circ$

Calculate: $m(\angle EAC)$

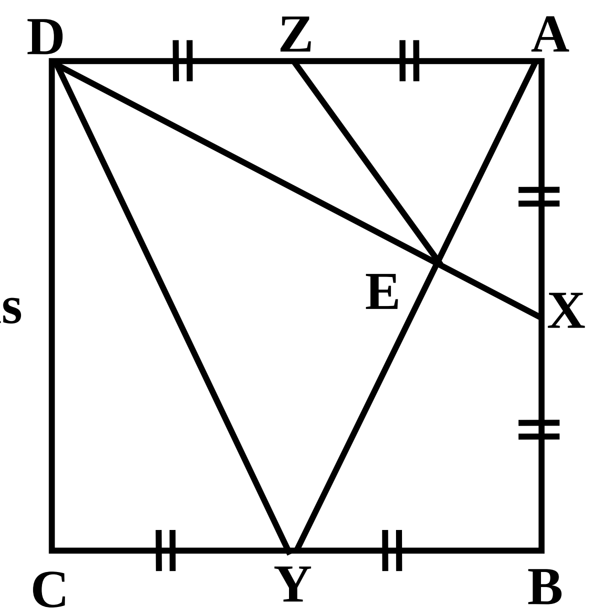


[209] ABC is an acute-angled triangle. The squares ABDE and BCYX Are drawn outside ΔABC if $\overline{AX}$ And $\overline{CD}$ are intersecting at F, Prove that:

1) ADBF is a cyclic Quadrilateral.
2) $\overline{AX} \perp \overline{CD}$
3) $\overrightarrow{FB}$ bisects $\angle XFD$



[210] ABCD is a square. , X, Y And Z are the midpoints of $\overline{AB}$, $\overline{BC}$ and $\overline{AD}$ Respectively. If $\overline{AY}$, and $\overline{DX}$ intersect at E , Prove that: the figure EYDZ is A cyclic quadrilateral.



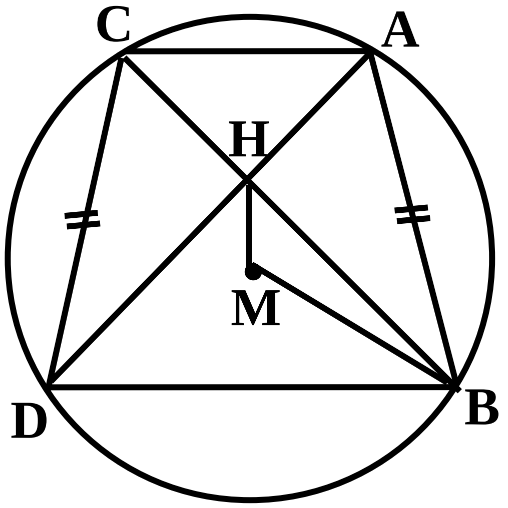
[211] $\overline{AB}$, $\overline{CD}$ Are chords in A circle M, AB = CD

$\overline{AD} \cap \overline{BC} = \{H\}$,

Prove that:

1) $m(\angle CAD) = m(\angle BDA)$

2) AHMB is a cyclic quad.



[212] In the opposite figure:

$\overline{AB}$ is a diameter of a circle with Centre N, $\overrightarrow{CB}$ is a tangent to the circle at B ,

$\overrightarrow{CN}$ cuts the circle at F and E and

$\overrightarrow{AF}$ cuts $\overrightarrow{CB}$ at D If

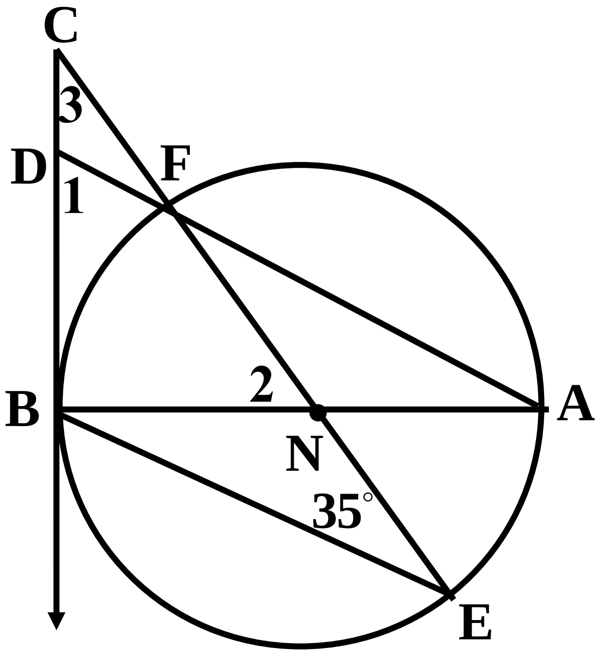
$m(\angle E) = 35^\circ$

Find:

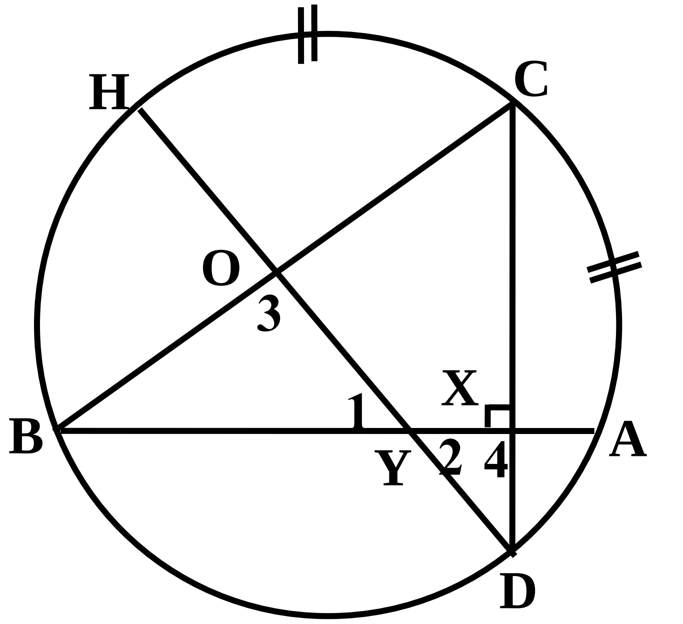
1) $m(\angle 1)$

2) $m(\angle 2)$

3) $m(\angle 3)$



[213] **In the opposite figure:**



m(AC) = m(HC) ,

$\overline{DC} \perp \overline{AB}$

Prove that :

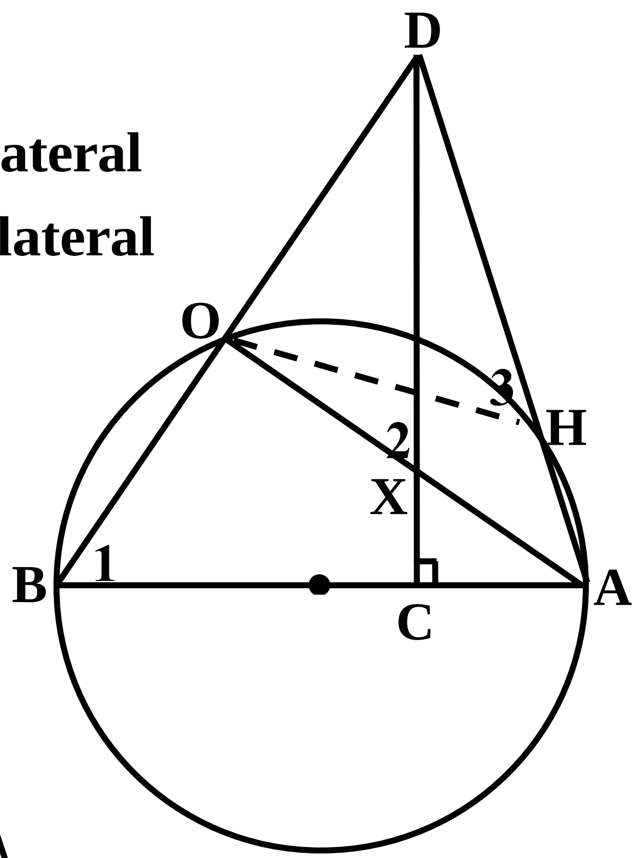
OCXY is a cyclic quadrilateral

[214] **In the opposite figure:**

Prove that:

1) OBCX is a cyclic quadrilateral

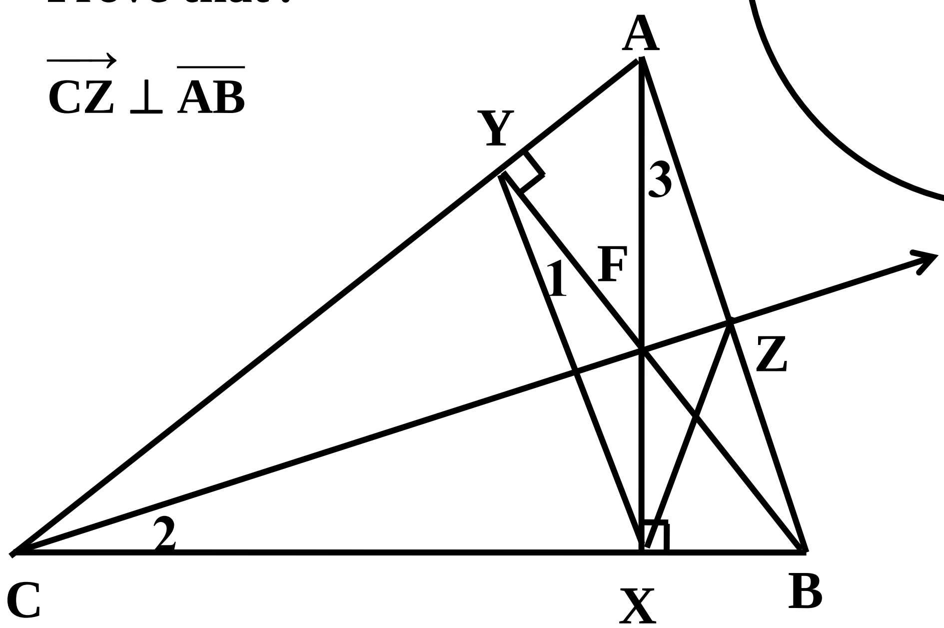
2) OXHD is a cyclic quadrilateral



[215] **In the opposite figure:**

Prove that :

$\overrightarrow{CZ} \perp \overline{AB}$

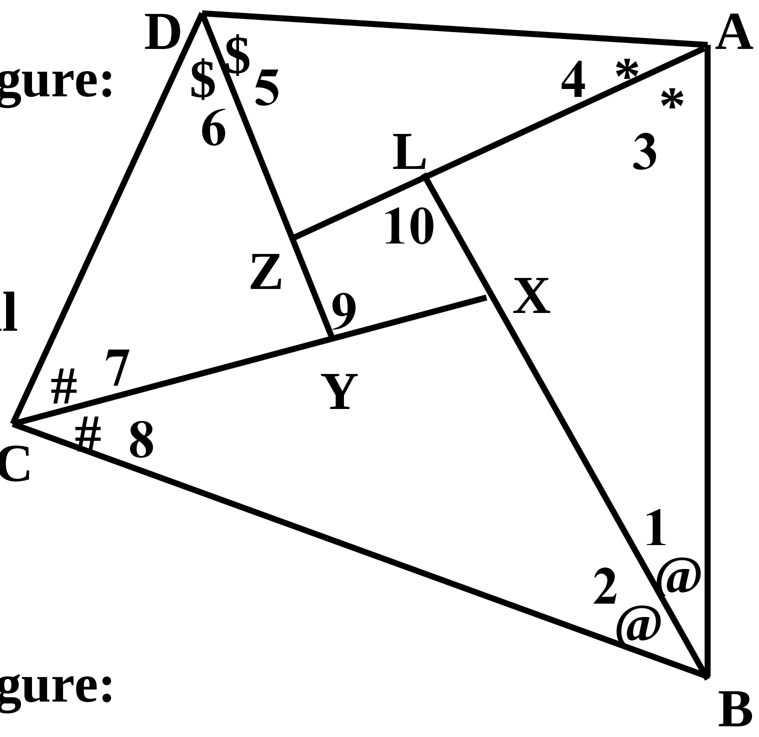


[216] **In the opposite figure:**

Prove that :

XYZL is

a cyclic quadrilateral

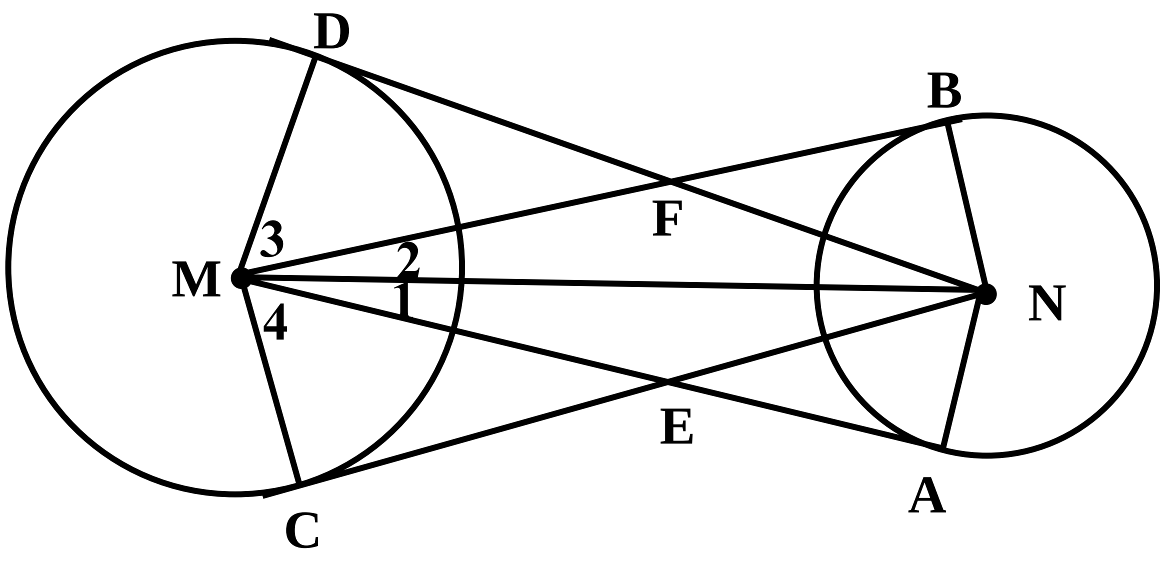


[217] **In the opposite figure:**

$\overline{MA}$, $\overline{MB}$ **are two tangents to the circle N ,**

$\overline{NC}$, $\overline{ND}$ **are two tangents to the circle M**

Prove that : FD = EC



Proof:

$\Delta\, MNB \equiv \Delta\, MAN$?

Then $m(\angle 1) = m(\angle 2)$ ....(I)

$\Delta\, NMD \equiv \Delta\, NMC$?

Then $m(\angle 2) + m(\angle 3) = m(\angle 1) + m(\angle 4)$ ....(II)

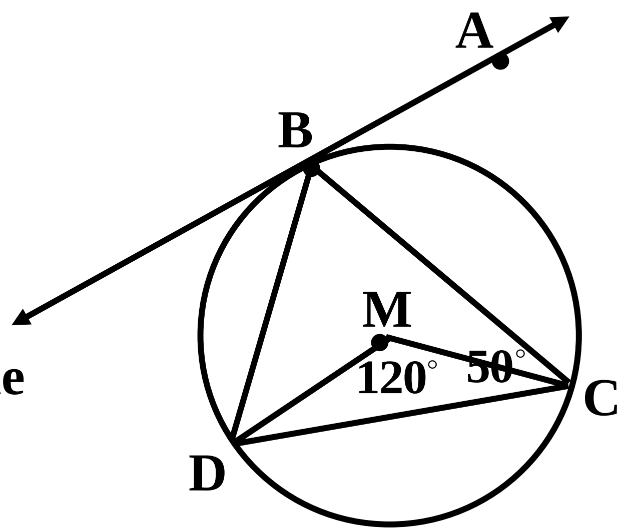
From (I) and (I)

$\therefore m(\angle 3) = m(\angle 4)$

$\therefore \Delta\, MDF \equiv \Delta\, MCE$?

$\therefore DF = CE$

[218] In the opposite figure:



$\overleftrightarrow{BA}$ is a tangent to a ccircle with centre M and radius 4.5 cm. long at the point B if $m(\angle CMD) = 120^\circ$ and $m(\angle BCD) = 50^\circ$

Calculate :

1) $m\left(\overset{\frown}{BCD}\right)$

2) The length of $\left(\overset{\frown}{BCD}\right)$

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[1] Complete:

1) Twice

2) Supplementary

3) $m(CH) - m(BD)$

4) $\frac{1}{4} \times 2\pi r = \frac{\pi r}{2}$

5) Equal in measure

6) 70°

[2] Choose:

1) $S = \frac{P}{4} = 20 \div 4 = 5$ cm , $A = S^2 = 5^2 = 25$

2) 90°

3) 2

4) $\frac{90}{360} = \frac{1}{4}$

5) The bisectors of its interior angles

6) $m(AB) = 2 \times 60 = 120^\circ$

Then $m(AXB) = 360^\circ - 120^\circ = 240^\circ$

[3] a)

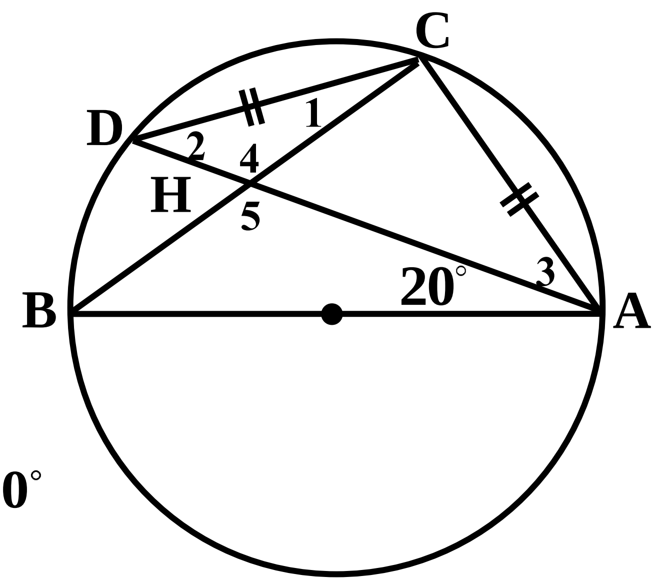
$m(\angle DAB) = m(\angle 1) = 20^\circ$

(Subtended by DB)

$\because$ $\overline{AB}$ is a diameter

$\therefore$ $m(\angle ACB) = 90^\circ$

$m(\angle ACD) = 90^\circ + 20^\circ = 110^\circ$



$\because$ CD = CA

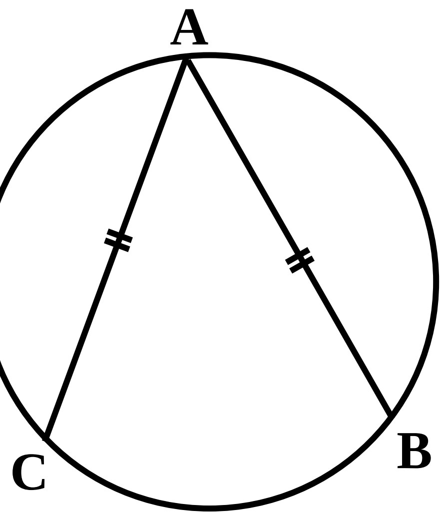
$\therefore$ $m(\angle 3) = m(\angle 2) = \dfrac{180^\circ - 110^\circ}{2} = 35^\circ$

In Δ CDH , $m(\angle 4) = 180^\circ - (20^\circ + 35^\circ)$

$= 180^\circ - 55^\circ = 125^\circ$

$m(\angle AHB) = m(\angle 4) = 125^\circ$

(V.O.A)



b)

$m(CB) = \dfrac{5}{18} \times 360^\circ = 100^\circ$

$\therefore$ $m(AB) = m(AC) = \dfrac{360^\circ - 100^\circ}{2}$

$= 130^\circ$

[4] a)

$\because$ HBCD is a cyclic quad.

$\therefore$ $m(\angle C) = 180^\circ - 110^\circ = 70^\circ$

$\because$ ABCD is a parallelogram

$\therefore$ $m(\angle C) = m(\angle A) = 70^\circ$

b)

$\because$ AD = DC $\quad\therefore$ $\overline{MD} \perp \overline{AC}$

$\because$ $\overline{AB}$ is a diameter $\quad\therefore$ $m(\angle ACB) = 90^\circ$

$\because$ $\overline{BH}$ is a tangent

$\therefore$ $m(\angle HBA) = 90^\circ$

$m(\angle B) + m(\angle D) = 90^\circ + 90^\circ = 180^\circ$

$\therefore$ MBHD is a cyclic quad.

$\because$ $m(\angle BCA) + m(\angle D)$

$= 90^\circ + 90^\circ = 180^\circ$

$\therefore$ $\overline{MD} \parallel \overline{BC}$

[5] a)

$\overleftrightarrow{XC} \parallel \overline{AB}$

$\therefore$ $m(\angle CXZ) = m(\angle ABX)$ ...... (1) (Alt.)

$\because$ $\overleftrightarrow{XC}$ is a tangent to the circle at X

$\therefore$ $m(\angle CXZ) = m(\angle Y)$ ...... (2)

From (1) and (2)

$\therefore$ $m(\angle ABX) = m(\angle Y)$ (Exterior)

$\therefore$ ABZY is a cyclic quad.

b)

$\because$ $m(\angle BAH) + m(\angle DAB) = 180^\circ$

$\therefore$ $m(\angle BAH) = 180^\circ - 120^\circ = 60^\circ$

$\because$ $\overleftrightarrow{DH}$ is a tangent

$\therefore$ $m(\angle ACB) = m(\angle BAH) = 60^\circ$ Subtended by BC

[1] Choose

2) All the following figures are cyclic quadrilateral except ....

(Rectangle , square , isosceles trapezium , rhombus)

5) If ABCD is a cyclic quad. ,

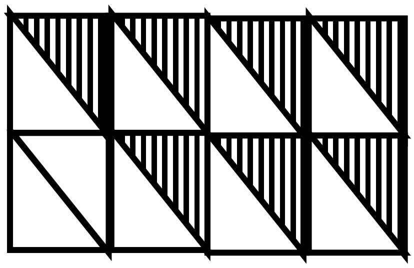
$m(\angle A) = 2\ m(\angle C)$ then $m(\angle A) = ...$

$\left(120^\circ, 60^\circ, 45^\circ, 180^\circ\right)$

[2] Complete:

6) In the opposite figure

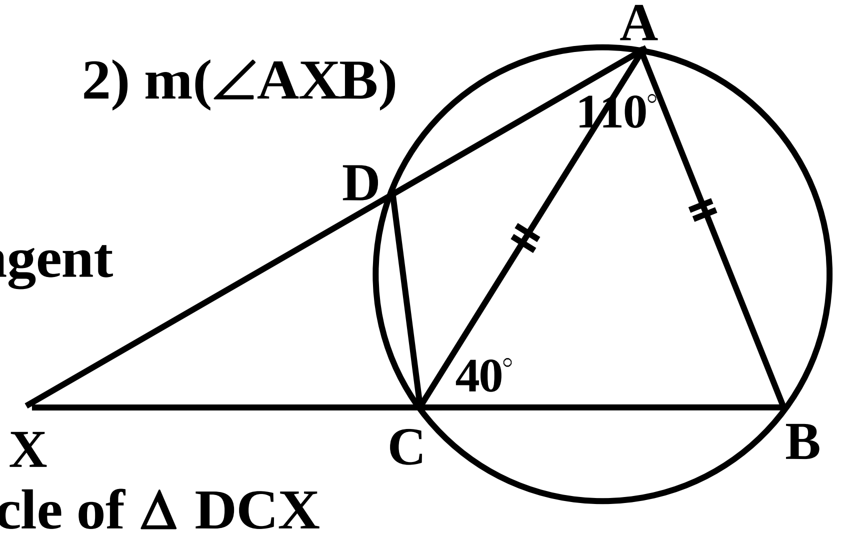
Area of the shaded part : Area of all figure = ...



[5]

Find : 1) $m(\angle ADC)$ 2) $m(\angle AXB)$

3) Prove that $\overline{AC}$ is a tangent of the circumcircle of Δ DCX



محافظة البحيرة

[1] Choose:

4) In Δ ABC , $AB^2 = AC^2 + BC^2$

Then $\angle$ C is .... angle.

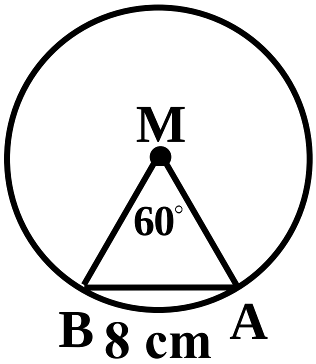
(Acute , Right , Obtuse , Straight)

5) In the opposite figure

m($\angle$AMB) = 60° , AB = 8 cm

Then the length of the radius = ... cm

(8 , 4 , 16 , 12)



محافظة قنا

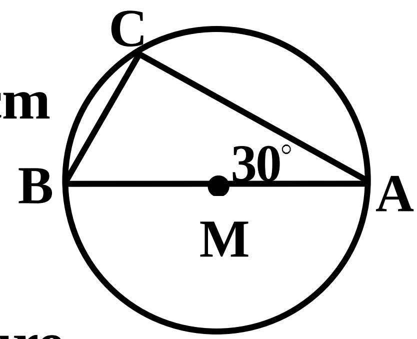
[1] Choose:

1) Number of common tangent of two distant circles = ... (1 , 2 , 3 , 4)

5) $\overline{AB}$ is a diameter in the circle ,

r = 4 cm ,m($\angle$A) = 30° , BC = ... cm

(4 , 2 , 6 , 3)



6) The ratio between the measure of the inscribed angle to the measure of the central angle subtended by the same arc is......

(3 : 1 , 1 : 3 , 2 : 1 , 1 : 2)

[2] Complete:

4) If ABCD is a cyclic quad. ,

$m(\angle A) = 3\ m(\angle C)$ then $m(\angle A) =$ ....

5) If half the surface area of a square is 32 cm^2

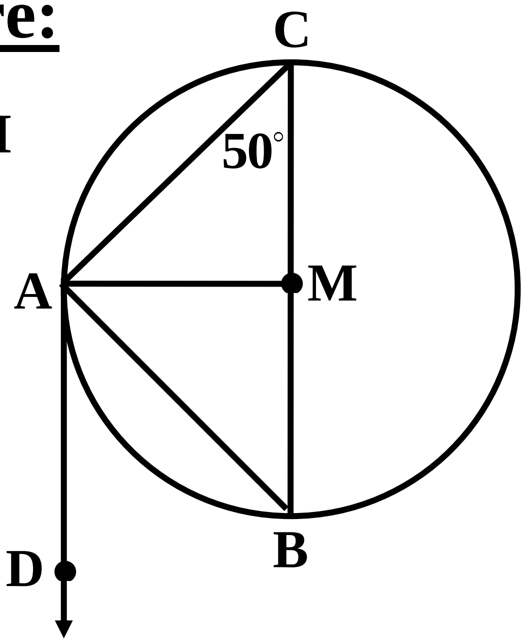
then its side length = ... cm

[3] b)In the opposite figure:

$\overrightarrow{AD}$ is a tangent to the circle M

$m(\angle C) = 50^\circ$ Find :

$m(\angle BAM)$

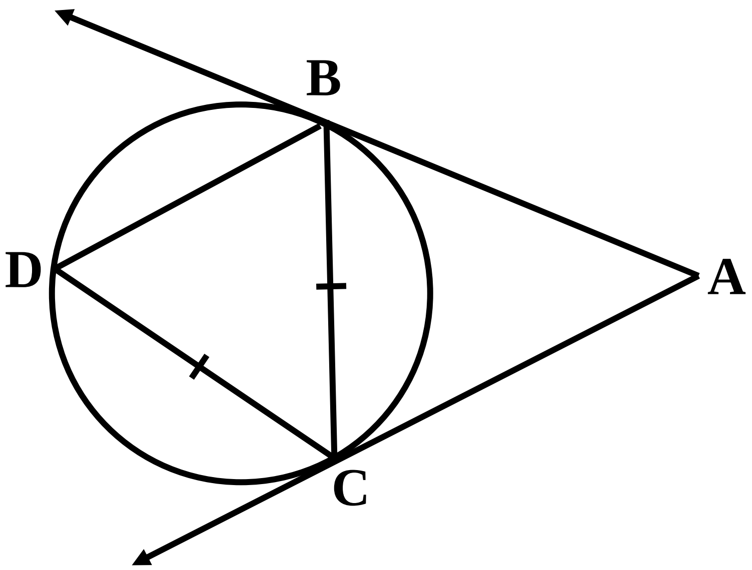


[4] In the opposite figure:

DC = CB Prove that:

1) $\overrightarrow{BC}$ bisect $\angle$ DBA

2) $\overline{CD}$ is a tangent to the circumcircle of Δ ABC



Cases for a quadrilateral to be cyclic

A quadrilateral is cyclic if there exist(s):

1) A point in the same plane equidistant from its four vertices.
2) Two angles equal in measure drawn on one of its sides as abase
3) Two opposite angles being supplementary.
4) An exterior angle at one of its vertices equals in measure the interior angle opposite to this vertex.

من الملزمة غير المحلولة

مسألة أـ إ

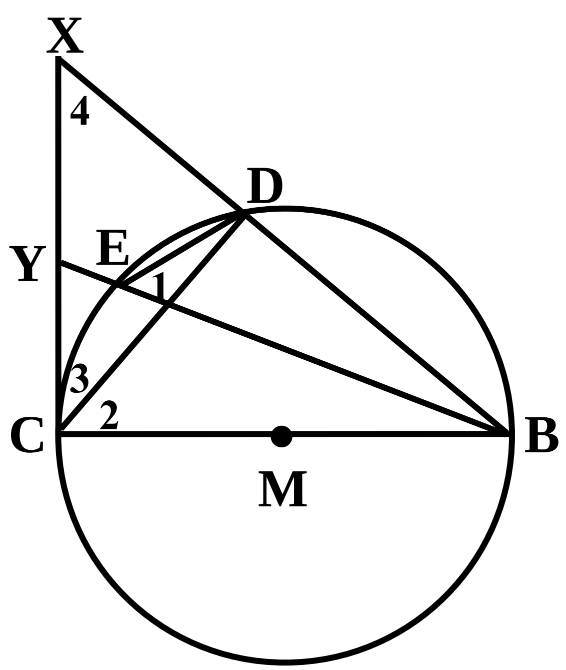
[85] In the opposite figure

$\overline{BC}$ is a diameter of a circle $\overline{BD}$ and $\overline{BE}$ are two chords of

It and on one side of $\overline{BC}$, from C a tangent is drawn to

the circle Cutting $\overrightarrow{BD}$ at X and $\overrightarrow{BE}$ at Y

Prove that : DEYX is a cyclic quadrilateral.



حل ثان لها وأسهل

Solution:

$\because m(\angle 1) = m(\angle 2)$ .... (1)

Subtended by BD

$\because \overline{XY}$ is a tangent

$\therefore m(\angle 2) + m(\angle 3) = 90^\circ$ .... (2)

$\because \overline{CB}$ is a diameter

$\therefore m(\angle BDC) = 90^\circ$ $\therefore m(\angle YDC) = 90^\circ$

$\therefore m(\angle 3) + m(\angle 4) = 90^\circ$ .... (3)

From (2) and (3)

$\therefore m(\angle 2) = m(\angle 4)$ .... (4)

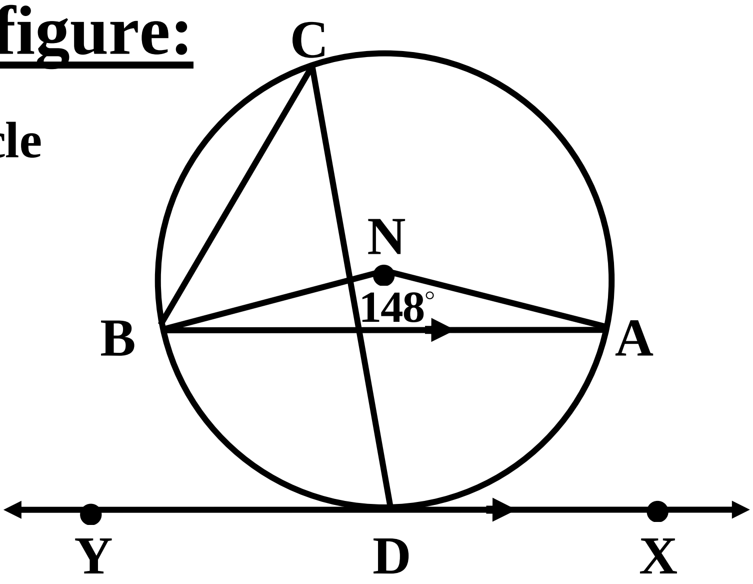
From (1) and (4)

$\therefore m(\angle 1) = m(\angle 4)$

$\therefore$ DEYX is a cyclic

[21] In the opposite figure:

$\overleftrightarrow{XY}$ is a tangent to the circle N at D and parallel to The chord $\overline{AB}$ if $m(\angle ANB) = 148^\circ$ Find $m(\angle BCD)$



Solution:

$\because$ $\overleftrightarrow{XY}$ is a tangent , $\overleftrightarrow{XY}$ // $\overline{AB}$

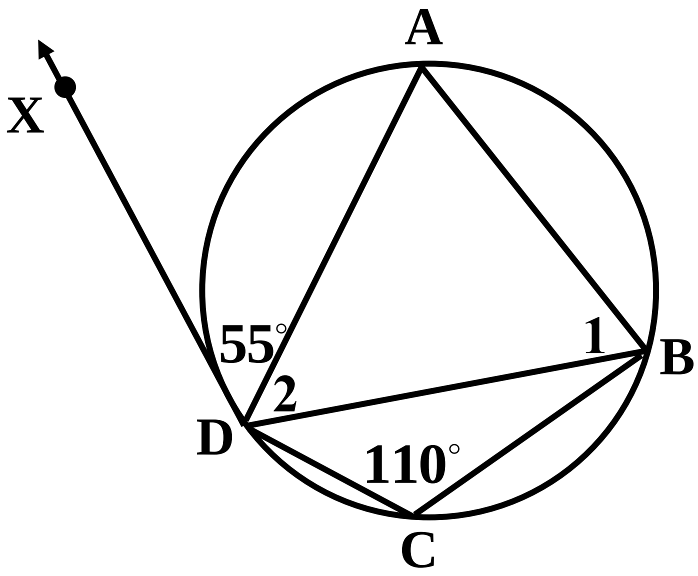
$\therefore$ m(AD) = m(BD) = 148° ÷ 2 = 74°

$\therefore$ m(∠BCD) = $\frac{1}{2}$ m(BD) = 74 ÷ 2 = 37°

[28] In the opposite figure:

ABCD is a quadrilateral
Inscribed in a circle in
Which AB = AD and
m(∠C) = 110° ,
m(∠ADX) = 55°

Prove that : $\overrightarrow{DX}$ is a tangent
To the circle



Solution:

$\because$ ABCD is a cyclic quad.

$\therefore$ m(∠A) = 180° − 110° = 70°

$\because$ AB = AD $\therefore$ m(∠1) = m(∠2) = $\frac{180^\circ - 70^\circ}{2}$ = 55°

$\therefore$ m(∠ADX) = m(∠1) = 55° $\therefore$ $\overrightarrow{DX}$ is a tangent to the circle

[34] In the following figure:

$\overline{AB}$ is a diameter in the circle M. D is the midpoint of $\overline{AC}$ and $\overrightarrow{BE}$ is a tangent to the circle to cut $\overrightarrow{DM}$ at E

Prove that: 1) the figure ADBE is a cyclic quadrilateral
2) m(∠CMB) = m(∠BED)

Solution:

$\because$ $\overrightarrow{BE}$ is a tangent

$\therefore$ $m(\angle ABE) = 90^\circ$

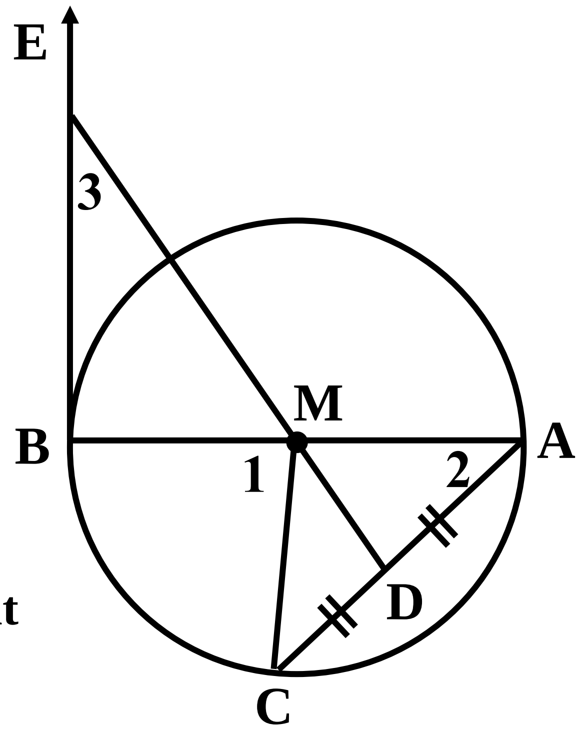
$\because$ AD = DC

$\therefore$ $m(\angle MDC) = 90^\circ$

$\therefore$ $m(\angle ABE) = m(\angle ADE) = 90^\circ$

Drawn on $\overline{AE}$ and in one side of it

$\therefore$ ADBE is a cyclic quad.



$\therefore$ $m(\angle 1) = 2\, m(\angle 2)$ BC

$\because$ $m(\angle 2) = m(\angle 3)$ $\overline{DB}$

$\therefore$ $m(\angle 1) = 2\, m(\angle 3)$

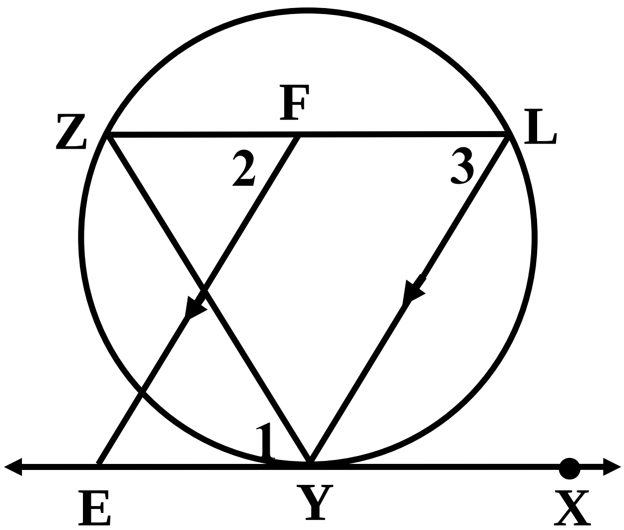
[3] In the opposite figure:

LYZ is a triangle inscribed in a circle , $\overleftrightarrow{XY}$ is a tangent to the circle at Y and $\overline{FE} // \overline{LY}$

Prove that:

1) $m(\angle EYZ) = m(\angle EFZ)$

2) The figure EYFZ is A cyclic quadrilateral



Proof:

$\because$ $\overleftrightarrow{EX}$ is a tangent

$\therefore$ $m(\angle 1) = m(\angle 3)$ ..... (I)

Subtended by the same arc

$\because$ $\overline{FE} // \overline{LY}$, $\overline{LZ}$ is a transversal

$\therefore\ m(\angle 2) = m(\angle 3)$ ..... (II)

Corresponding angles

From (I) and (II)

$\therefore\ m(\angle 1) = m(\angle 2)$ .... (1)

Drawn on $\overline{ZE}$ and in one side of it

$\therefore$ EYFZ is a cyclic

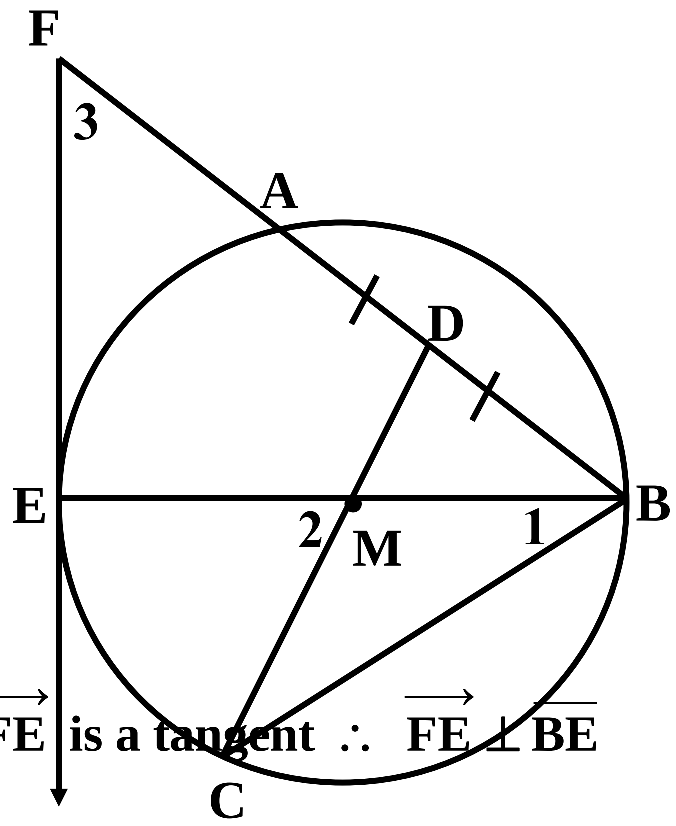
[4] in the opposite figure

$\overline{BE}$ Is a diameter of the circle M, D is the midpoint of $\overline{AB}$ and $\overrightarrow{FE}$ is a tangent to the circle M at E

Prove that

1) FDME is a cyclic quadrilateral

2) $m(\angle F) = 2m(\angle CBE)$



Proof:

$\because\ AD = DB$ $\therefore\ \overline{MD} \perp \overline{AB}$ $\because\ \overrightarrow{FE}$ is a tangent $\therefore\ \overrightarrow{FE} \perp \overline{BE}$

In FDME

$\because\ m(\angle E) + m(\angle D) = 90^\circ + 90^\circ = 180^\circ$

$\therefore$ FDME is a cyclic quadrilateral

$\therefore\ m(\angle 2) = m(\angle 3)$ .... (I)

(Exterior of FDME)

$\because\ m(\angle 1) = \frac{1}{2}\ m(\angle 2)$ .... (II)

(Subtended by the same arc)

From (I) and (II)

$\therefore$ m($\angle$3) = 2 m($\angle$ 1)

[5] In the opposite figure

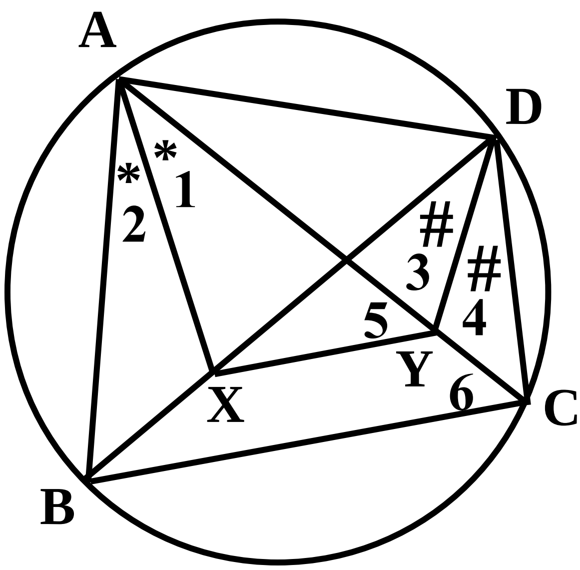
ABCD is a cyclic quadrilateral

$\overline{AX}$ bisects $\angle$BAC , $\overline{DY}$

bisects $\angle$BDC Prove that :

1) AXYD is a cyclic quad.

2) $\overline{XY}$ / / $\overline{BC}$



Proof:

$\because$ ABCD is a cyclic

$\therefore m(\angle BAC) = m(\angle BDC)$

$\therefore \frac{1}{2} m(\angle BAC) = \frac{1}{2} m(\angle BDC)$

$\therefore m(\angle 1) = m(\angle 3)$

(Drawn on $\overline{XY}$ and in one side of it)

$\therefore$ AXYD is a cyclic quadrilateral

$\therefore m(\angle 5) = m(\angle 7)$ ....(I)

$\because m(\angle 6) = m(\angle 7)$ ....(II)

(Subtended by the same arc)

From (I) and (II)

$\therefore m(\angle 6) = m(\angle 5)$ and they are corresponding angles

$\therefore \overline{XY} // \overline{BC}$

[6] In the opposite figure:

$\overline{AB}$ is a diameter of the circle M

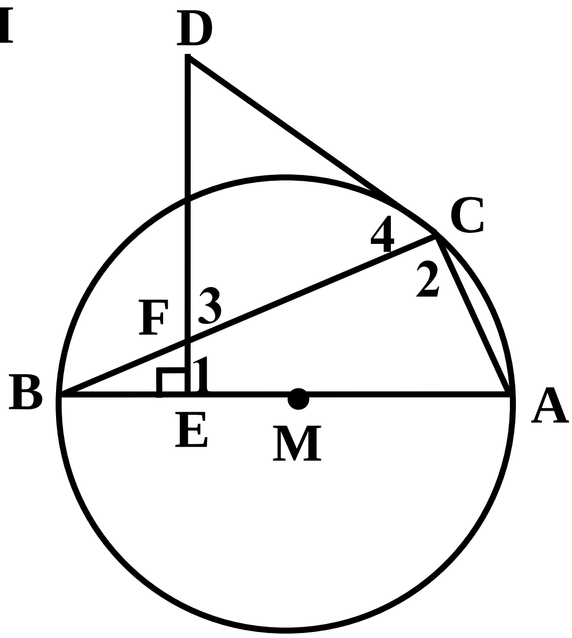
$\overline{CD}$ touches the circle at C and

$\overline{DE} \perp \overline{AB}$

Prove that:

1) ACEF is a cyclic quadrilateral

2) DC = DF



Proof:

$\because \overline{AB}$ is a diameter

$\therefore m(\angle ACB) = 90^\circ$ ....(I)

$\because \overline{DE} \perp \overline{AB}$ ....(II)

From (I) and (II)

$\therefore m(\angle 1) + m(\angle 2) = 90^\circ + 90^\circ = 180^\circ$

$\therefore$ AEFC is a cyclic quadrilateral

$\therefore m(\angle 3) = m(\angle A)$ ....(I)

(exteriorangle)

$\because \overline{DC}$ is a tangent

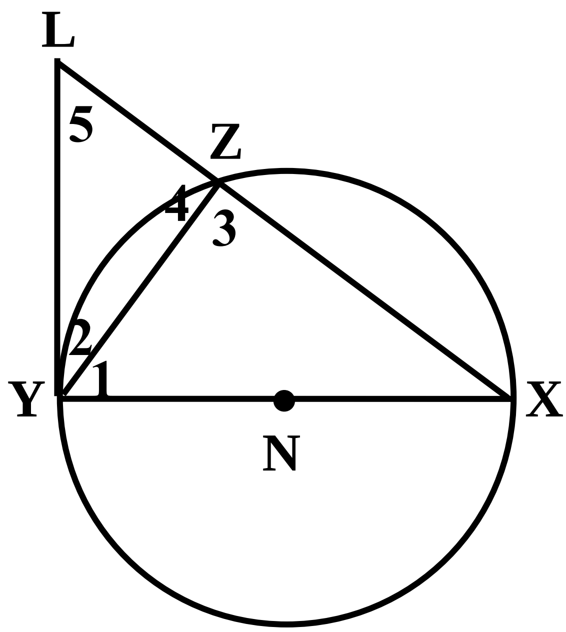
$\therefore m(\angle 4) = m(A)$ ....(II)

From (I) and (II)

$\therefore m(\angle 3) = m(\angle 4)$

$\therefore DC = DF$

[7] In the opposite figure:



$\overline{XY}$ is a diameter in the circle N

$\overline{XZ}$ is a chord in it.draw $\overrightarrow{YL}$

A tangent to cut $\overrightarrow{XZ}$ at L

Prove that:

$\overleftrightarrow{XY}$ is a tangent to the

Circumcircle of Δ ZYL

Proof:

$\because \overline{LY}$ is a tangent

$\therefore m(\angle 1) + m(\angle 2) = 90^\circ$ ....(I)

$\because \overline{XY}$ is a diameter

$\therefore m(\angle 3) = m(\angle 4) = 90^\circ$

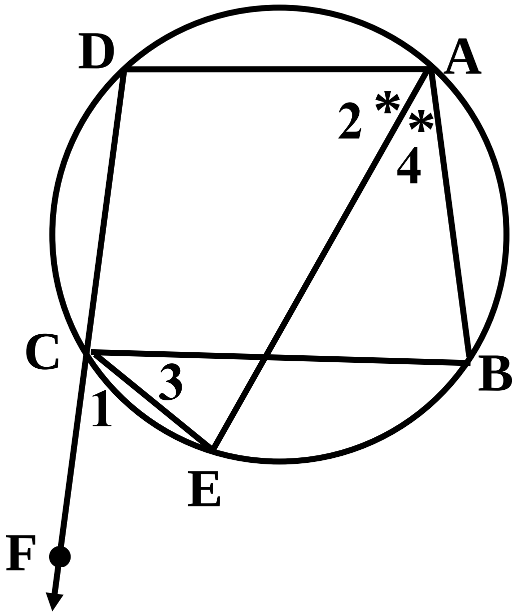
$\therefore m(\angle 2) + m(\angle 5) = 90^\circ$ ....(II)

From (I) and (II)

$\therefore m(\angle 1) = m(\angle 5)$

$\therefore \overleftrightarrow{XY}$ is a tangent to the circumcircle of Δ ZYL

[8] In the opposite figure



ABCD is a cyclic quadrilateral

$F \in \overrightarrow{DC}$ and $\overrightarrow{AE}$ bisects $\angle BAD$

Prove that :

$\overrightarrow{CE}$ bisects $\angle BCF$

Proof:

$\because$ AECD is a cyclic

$\therefore m(\angle 1) = m(\angle 2)$ ....(I)

Exterior angle

$\because m(\angle 3) = m(\angle 4)$ .....(II)

Subtended by the same arc

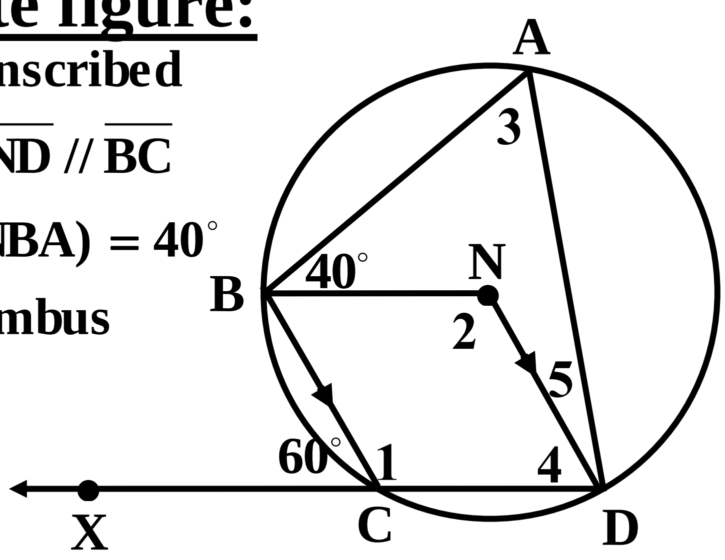
$\because m(\angle 2) = m(\angle 4)$ .....(III)

From (I), (II) and (III)

$\therefore m(\angle 1) = m(\angle 3)$

$\therefore \overrightarrow{CE}$ bisects $\angle BCF$

[115] In the opposite figure:



ABCD is a quadrilateral inscribed in a circle with centre N, $\overline{ND} \parallel \overline{BC}$

if $m(\angle BCX) = 60^\circ$, $m(\angle NBA) = 40^\circ$

Prove that NDCB is a rhombus

then find $m(\angle ADN)$

Proof:

$\because \overline{ND} // \overline{BC}$

$\therefore m(\angle BCX) = m(\angle 4) = 60^\circ$

(Corresponding angles)

$\because m(\angle 1) + m(\angle BCX) = 180^\circ$

$\therefore m(\angle 1) = 180^\circ - 60^\circ = 120^\circ$

$\because m(\angle 3) + m(\angle 1) = 180^\circ$

$\therefore m(\angle 3) = 180^\circ - 120^\circ = 60^\circ$

$\therefore m(\angle 2) = 2 \times m(\angle 3) = 2 \times 60^\circ = 120^\circ$

$\because m(\angle 4) + m(\angle 2) = 60^\circ + 120^\circ = 180^\circ$

$\therefore \overline{NB} // \overline{DC}$ ....(I)

$\because \overline{ND} // \overline{BC}$ ....(II)

$\because ND = NB$ ....(III)

From (I) , (II) and (III)

$\therefore$ NBCD is a rhombus

$\because$ ABCD is a cyclic quadrilateral

$\therefore m(\angle ABC) + m(\angle ADC) = 180^\circ$

$\therefore 40^\circ + 60^\circ + 60^\circ + m(\angle 5) = 180^\circ$

$\therefore m(\angle 5) = 180^\circ - (60^\circ + 60^\circ + 40^\circ) = 20^\circ$

[112] In the opposite figure:

Two circles touch internally at A

$\overrightarrow{BA}$, $\overrightarrow{BC}$ touch the smaller circle

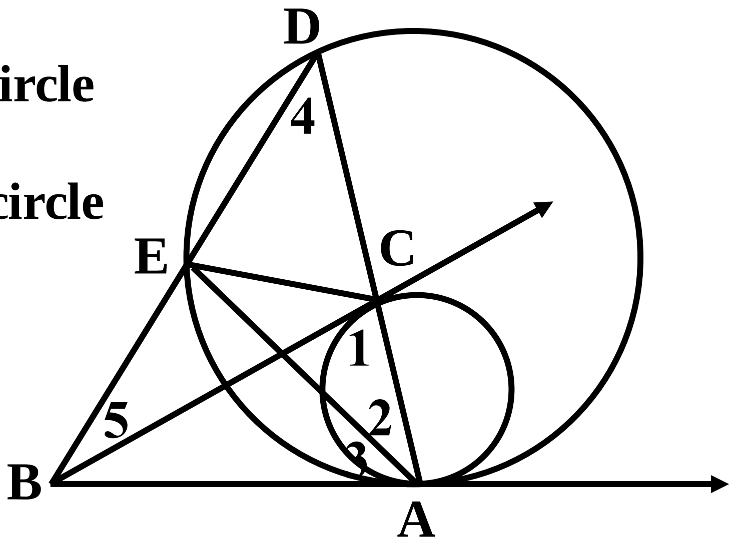
at A , C. $\overrightarrow{AC}$ cuts the larger circle

at D and $\overline{DB}$ cuts the larger

circle at E. Prove that

ABEC is a cyclic

quadrilateral



Proof:

$\because$ $\overrightarrow{BA}$, $\overrightarrow{BC}$ are two tangents

$\therefore m(\angle 1) = m(\angle 2) + m(\angle 3)$ ....(I)

$\because m(\angle 3) = m(\angle 4)$ ....(II)

(Subtended by the same arc)

$\because \angle 1$ is exterior of Δ DCB

$\therefore m(\angle 1) = m(\angle 4) + m(\angle 5)$ ....(III)

From (I) , (II) and (III)

$\therefore m(\angle 2) = m(\angle 5)$

Drawn on $\overline{EC}$ and in one side of it

$\therefore$ ABEC is a cyclic quadrilateral

محافظة البحيرة

Model Answer

[1]

1) Inscribed

2) 8 cm

3) Supplementary

4) $W = \frac{p}{2} - L = \frac{16}{2} - 6 = 2$ $\quad A = 6 \times 2 = 12\,cm^2$

5) $\frac{2}{5} \times 360 = 144^\circ$

6) $4x - 5 = 3x + 1 \quad \therefore 4x - 3x = 1 + 5 \quad \therefore x = 6$

[2]

1) $\frac{110^\circ - 40^\circ}{2} = 35^\circ$

2) 4

3) $\sqrt{5^2 - 3^2} = 4\,cm$

4) $\frac{90^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 7 = 11\,cm$

5) $m(\angle AMC) = 180^\circ - (35^\circ + 35^\circ) = 110^\circ$

$m(\angle ABC) = \frac{1}{2} \times 110^\circ = 55^\circ$

6) $m(\angle C) = \frac{1}{2} \times 130^\circ = 65^\circ$

$\therefore m(\angle A) = 180^\circ - 65^\circ = 115^\circ$

[3]

a) $\because \overrightarrow{AX}$ is a tangent

$\therefore m(\angle 1) = m(\angle C)$ ....(1)

(Subtended by the same arc)

$\because \overline{ED} \,//\, \overline{CB}$, $\overline{AC}$ is a transversal

$\therefore m(\angle E) = m(\angle C)$ .....(2)

(Corresponding angles)

From (1) and (2)

$\therefore m(\angle 1) = m(\angle E)$

$\therefore \overrightarrow{AX}$ is a tangent to the circumcircle of Δ ADE

b) $\because$ ABCD is a cyclic quadrilateral

$\therefore m(\angle D) = 180^\circ - 70^\circ = 110^\circ$

In Δ ACD

$\because DA = DC$

$\therefore m(\angle 1) = m(\angle 2)$

$= \dfrac{180^\circ - 110^\circ}{2} = 35^\circ$

[4]

a) $\because \overleftrightarrow{AX}$ is a tangent

$\therefore m(\angle 1) = m(\angle 2) = 40^\circ$

(Subtended by the same arc)

In Δ ABC

$m(\angle 3) = 180^\circ - (110^\circ + 40^\circ) = 30^\circ$

$m(\angle 4) = m(\angle 3) = 30^\circ$

(Subtended by the same arc)

b) $\because \overrightarrow{AC}, \overrightarrow{AB}$ are two tangents to the circle M

$\therefore m(\angle 1) = m(\angle 2) = m(\angle D) = 80^\circ$

(Subtended by the same arc)

$\therefore m(\angle A) = 180^\circ - (80^\circ + 80^\circ) = 20^\circ$

[5]

a) $\because \overline{CD} // \overline{XY}$, $\overline{AC}$ is a transversal

$\therefore m(\angle 1) = m(\angle 2)$ ......(I)

(coressponding angles)

$\because m(\angle 1) = m(\angle 3)$ ......(II)

(Subtended by the same arc)

From (I) and (II)

$\therefore m(\angle 2) = m(\angle 3)$

(Drawn on $\overline{AY}$ and in on one side of it)

$\therefore$ ABXY is a cyclic quadrilateral

b) $\because \overline{BC}$ is a diameter

$\therefore$ m ($\angle$ A) = 90°

In ABDE

m ($\angle$ A) + m ($\angle$ D) = $90^\circ + 90^\circ = 180^\circ$

$\therefore$ ABDE is a cyclic quadrilateral

$\Delta\,\Delta$ ABC , DEC

m ($\angle$ EDC) = m ($\angle$ CAB) = 90°

$\angle$ C is a common angle ,

$$\therefore m(\angle ABC) = m(\angle CED) = \frac{1}{2}\, m(AC)$$

محافظة الجيزة

[1] Complete:

1) Inscribed
2) Bisectors of the interior angles of a triangle
3) 180°
4) $5x - 8 = 3x + 20$

$\therefore 5x - 3x = 20 + 8 \quad \therefore 2x = 28$

$\therefore \frac{2x}{2} = \frac{28}{2} \quad \therefore x = 14$

5) Equal in measure
6) 6 + 6 + 6 + 6 + 6 = 30 cm

[2] Choose:

1) $m(\angle B) = m(\angle D) = \dfrac{360^\circ - 140^\circ}{2} = \dfrac{220^\circ}{2} = 110^\circ$

2) 2 : 1

3) $BC = \dfrac{1}{2} \times AB = \dfrac{1}{2} \times 8 = 4\,cm$

4) 60°

5) 4

6) $2x = 180^\circ - 58^\circ = 122^\circ$

$x = 122^\circ \div 2 = 61^\circ$

[3]

a) Left

b) $m(\angle A) = \dfrac{1}{2} m(\angle BMC) = \dfrac{1}{2} \times 100^\circ = 50^\circ$

$\because \angle ABD$ is exterior of ΔABC

$\therefore m(\angle ABD) = m(\angle A) + m(\angle ACB)$

$\therefore m(\angle ACB) = 120^\circ - 50^\circ = 70^\circ$

[4]

$\because$ YEDZ is a cyclic quadrilateral

$\therefore m(\angle 1) = 180^\circ - 130^\circ = 50^\circ$ ....(I)

$\because \overrightarrow{XY}, \overrightarrow{XZ}$ are two tangents to the circle

$\therefore m(\angle 2) = m(\angle 3) = \dfrac{180^\circ - 80^\circ}{2} = 50^\circ$ ......(II)

$\therefore m(\angle 4) = m(\angle 2) = 50^\circ$ ....(III)

(Subtended by the same arc)

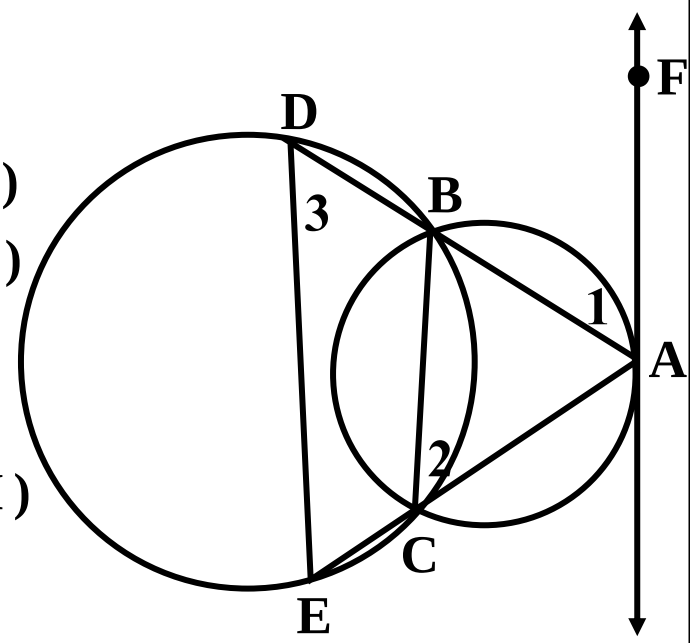
$\therefore m(\angle 4) = m(\angle 1) = 50^\circ$

$\therefore ZE = ZY$

$\because m(\angle 1) = m(\angle 2) = 50^\circ$ and they are alternate angles

$\therefore \overline{XZ} // \overline{YE}$

[5]



$\because \overleftrightarrow{EF}$ is tangent to small circle

$\therefore m(\angle 1) = m(\angle 2)$ ....(I)

(Subtended by the same arc)

$\because \angle 2$ is exterior of the cyclic quadrilateral BCED

$\therefore m(\angle 2) = m(\angle 3)$ ....(II)

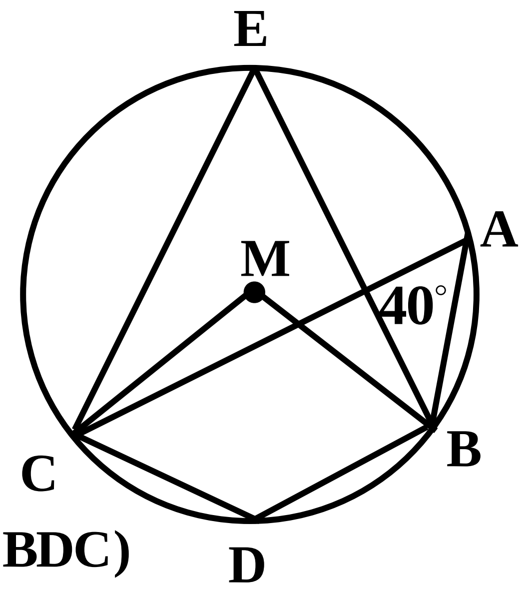
From (I) and (II)

$\therefore m(\angle 1) = m(\angle 3)$

and they are alternate angles

$\therefore \overleftrightarrow{AF} // \overline{DE}$

[49] In the opposite figure:



The chords $\overline{AC}$ and $\overline{BE}$ intersects

At X , M is the centre of the

Circle , D ∈ draw $\overline{MB}$

$\overline{MC}$ and $\overline{AB}$ if $m(\angle BAC) = 40^\circ$

Find :

1) $m(\angle BEC)$ 2) $m(\angle BMC)$ 3) m(BDC)

Proof:

1) $m(\angle E) = m(\angle A) = 40^\circ$

(Subtended by the same arc)

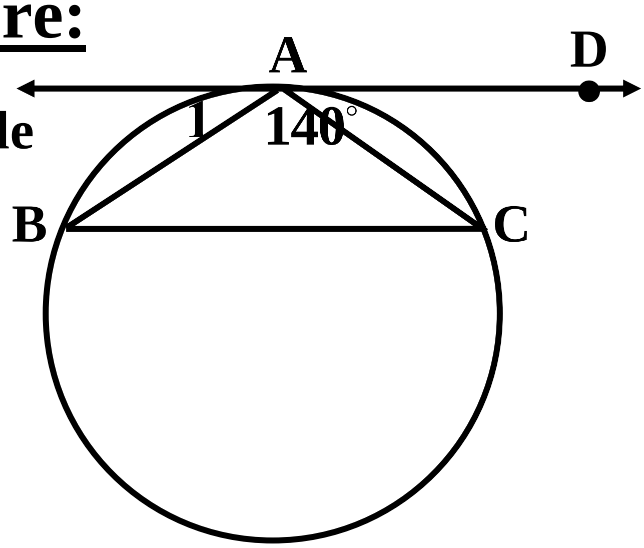
$m(\angle BMC) = 2m(\angle E) = 2\times 40^\circ = 80^\circ$

(Subtended by the same arc)

$m(\angle D) + m(\angle A) = 180^\circ$

$m(\angle D) = 180^\circ - 40^\circ = 140^\circ$

[51] In the opposite figure:



If $\overrightarrow{AD}$ is a tangent to the circle

At A , $m(\angle DAB) = 140^\circ$

Find : $m(\angle C)$

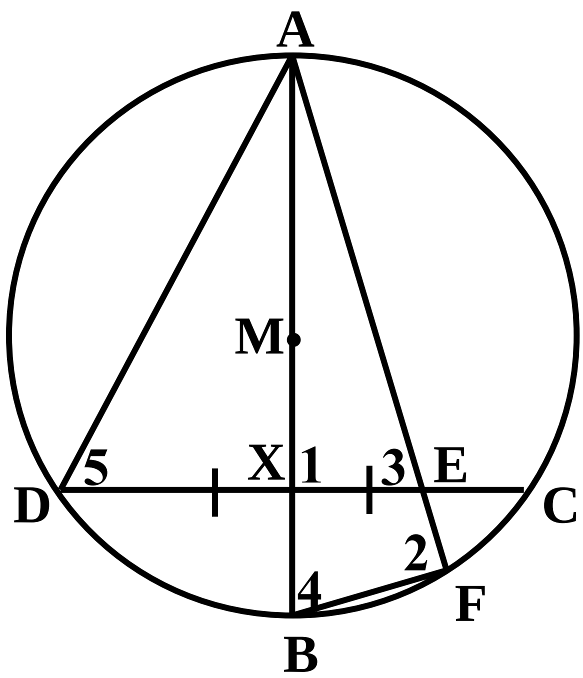
Proof:

$m(\angle 1) = 180^\circ - 140^\circ = 40^\circ$

$m(\angle 1) = m(\angle C) = 40^\circ$

(Subtended by the same arc)

[64]In the opposite figure



$\overline{CD}$ Is a chord of the circle M, X is the midpoint of $\overline{CD}$ and $E \in \overline{CX}$

Prove that

1) EFBX is a cyclic quadrilateral

2) $m(\angle AEX) = m(\angle ADF)$

Proof:

$\because \overline{AB}$ is a diameter

$\therefore \; m(\angle 2) = 90^\circ$

$\because DX = XC$

$\therefore m(\angle 1) = 90^\circ$

$\because m(\angle 1) = m(\angle 2) = 90^\circ$

$\therefore$ XEFB is a cyclic quadrilateral

$\therefore m(\angle 3) = m(\angle 4)$ ....(I)

(Exterior of the cyclic XEFB)

$\because m(\angle 5) = m(\angle 4)$ ....(II)

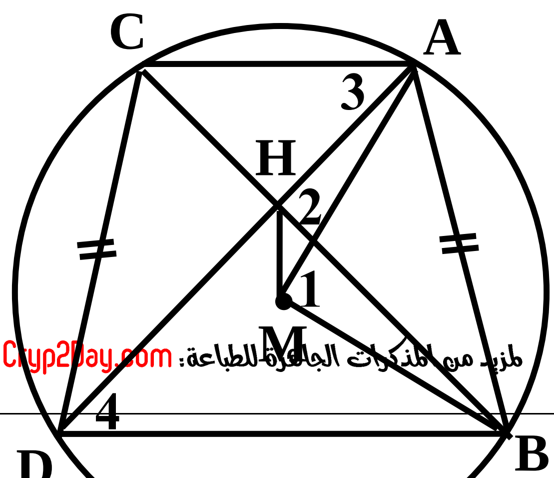
(Subtended by the same arc)

From (I) and (II)

$\therefore m(\angle 3) = m(\angle 5)$

[68] $\overline{AB}, \overline{CD}$ Are chords in A circle M, AB = CD

$\overline{AD} \cap \overline{BC} = \{H\}$,



Prove that:

1) $m(\angle CAD) = m(\angle BDA)$

2) AHMB is a cyclic quad.

Proof:

$\because \overline{AD} \cap \overline{BC} = \{H\}$

$\therefore m(\angle 2) = \dfrac{m(AB) + M(CD)}{2}$

$\because m(AB) = m(CD)$

$\therefore m(\angle 2) = m(AB)$ ......(I)

$m(\angle 1) = m(AB)$ ....(II)

From (I) and (II)

$\therefore m(\angle 1) = m(\angle 2)$

(Drawn on $\overline{AB}$ and in one side of it)

$\therefore$ AHMB is a cyclic quadrilateral

$m(\angle 3) = m(\angle 4) = \dfrac{1}{2} m(AB) = \dfrac{1}{2} m(CD)$

[1] Complete:

1) If the quadrilateral is a cyclic then every two opposite angles are …………..

2) Measure of the angle of tangency is equal to the measure of the ……… subtended by the same arc.

3) The area of a square whose diagonal length is $4\sqrt{2}$ cm = ………. cm^2

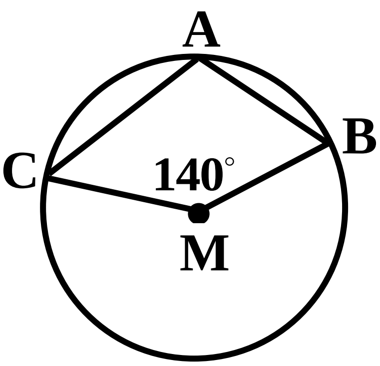


Figure (1)

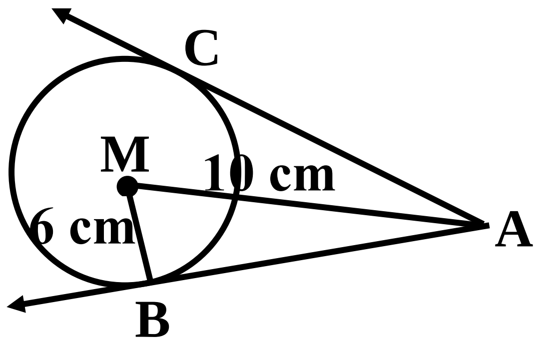


Figure (2)

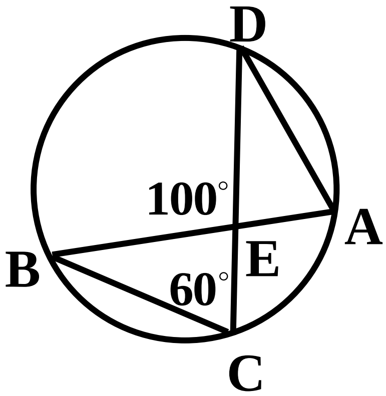


Figure (3)

4) In figure (1) circle M , m ($\angle$ BMC) = 140°
then m ($\angle$ BAC) = ……….°

5) In figure (2) , $\overrightarrow{AB}$, $\overrightarrow{AC}$ are two tangents of the circle M
BM = 6 cm , AM = 10 cm , then AC = ……… cm

6) In figure (3) , m ($\angle$ DEB) = 100° , m ($\angle$ C) = 60°
then m ($\angle$ ADC) = ………°

[2] Choose:

1) The two tangents drawn at the ends of a diameter of a circle are …………
(parallel , equal , intersecting , perpendicular)

2) measure of the inscribed angle drawn on $\frac{1}{3}$ of a circle equals ....$^\circ$ (120 , 240 , 60 , 30)

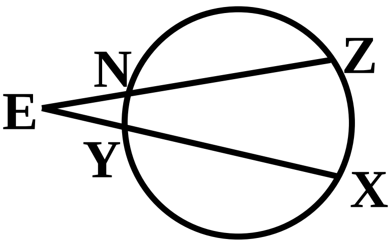


Figure (1)

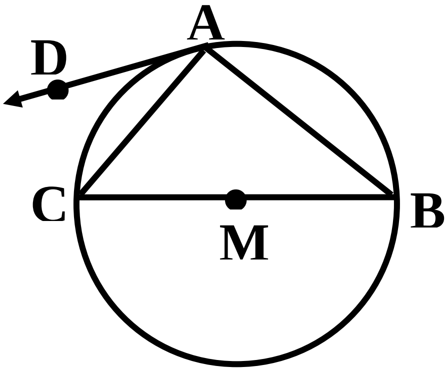


Figure (2)

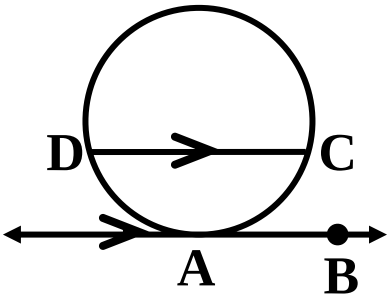


Figure (3)

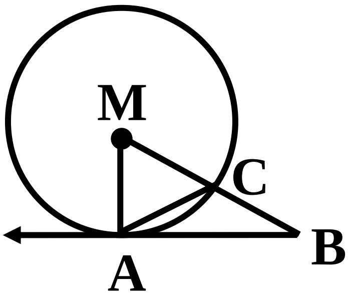


Figure (4)

3) In figure (1) m (XZ) = 70° , m (YN) = 30°
then m ($\angle$E) = ...$^\circ$ (20 , 40 , 50 , 100)

4) In figure (2) $\overrightarrow{AD}$ is a tangent to the circle M at A
m ($\angle$CAD) = 30° then m ($\angle$C) = ...$^\circ$
(90 , 60 , 120 , 30)

5) In figure (3) $\overleftrightarrow{AB}$ is a tangent to the circle at A ,

$\overleftrightarrow{AB} // \overline{CD}$, m (AC) = 90° then m (∠ C) = ...°

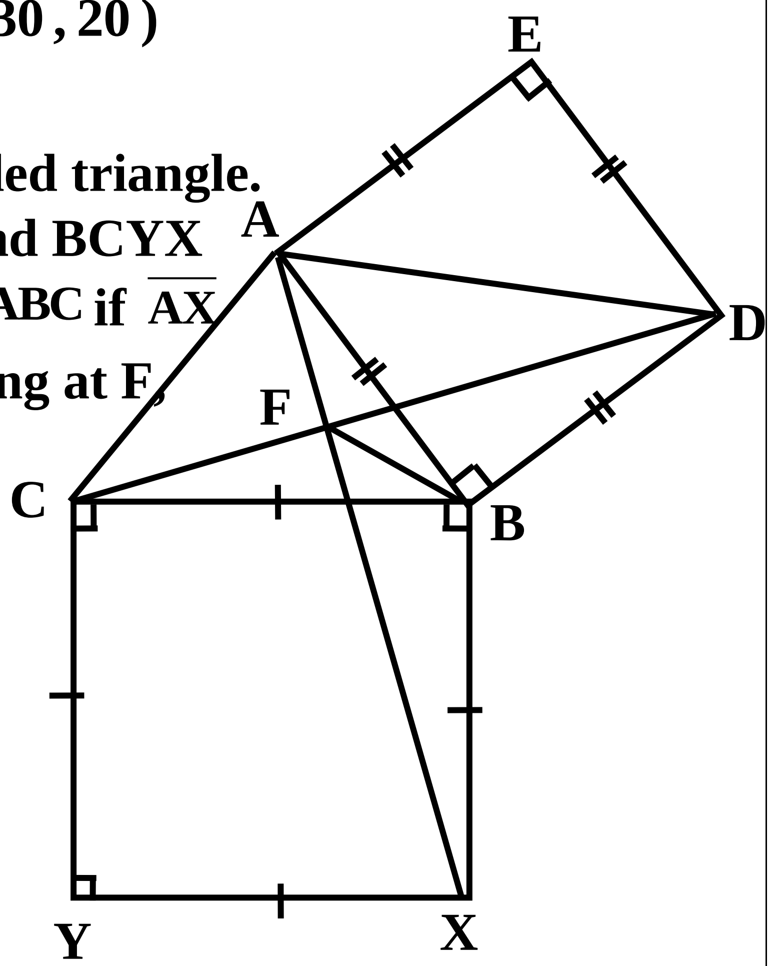
(50 , 45 , 100 , 30)

6) In figure (4) $\overrightarrow{BA}$ is a tangent to the circle M

, CA = MA , m (∠ B) = ...°

(70 , 60 , 30 , 20)

[70] ABC is an acute-angled triangle.
The squares ABDE and BCYX
Are drawn outside ΔABC if $\overline{AX}$
And $\overline{CD}$ are intersecting at F,



Prove that:

1) ADBF is a cyclic Quadrilateral.

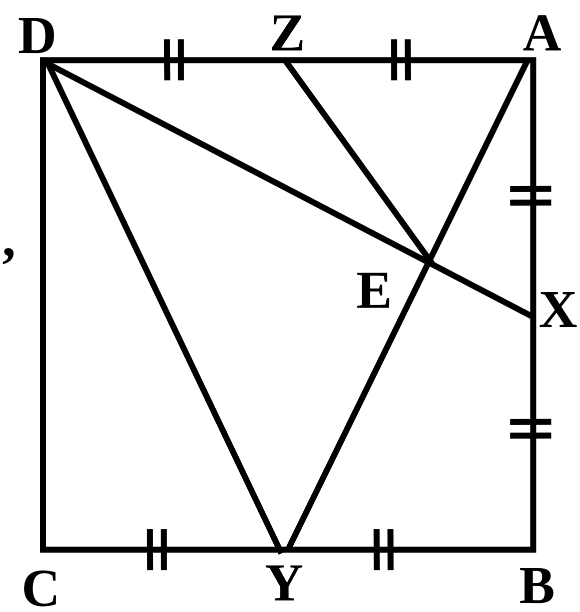
2) $\overline{AX} \perp \overline{CD}$

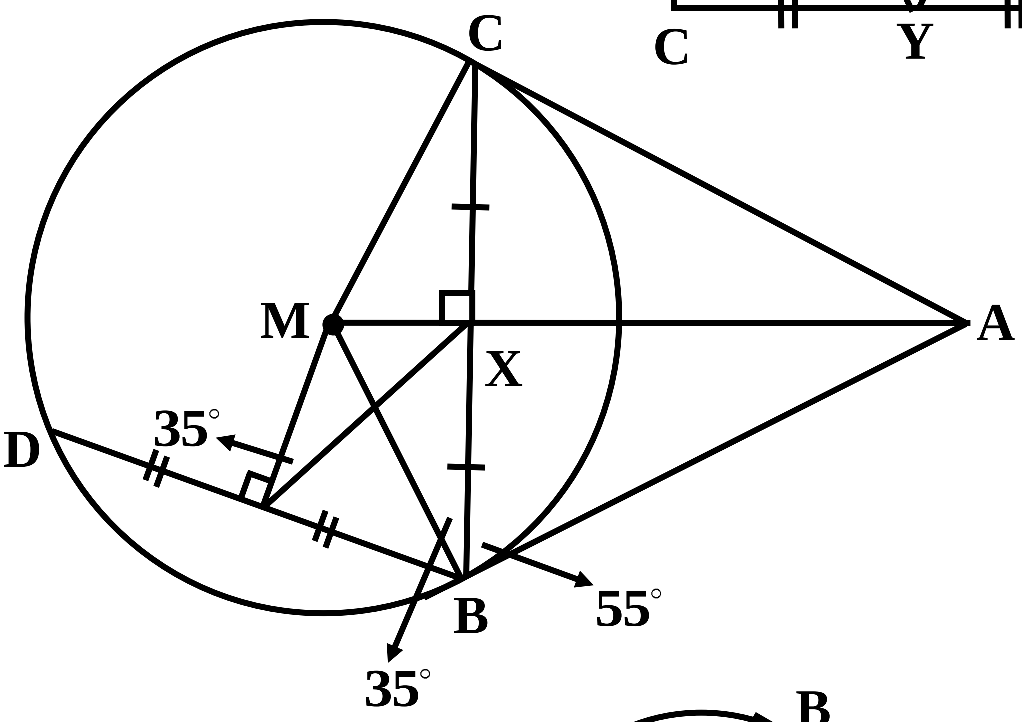
3) $\overrightarrow{FB}$ bisects ∠ XFD

[72] ABCD is a square. , X, Y And Z are the midpoints of $\overline{AB}$, $\overline{BC}$ and $\overline{AD}$ Respectively. If $\overline{AY}$, and $\overline{DX}$ intersect at E,

Prove that:

The figure EYDZ is A cyclic quadrilateral.

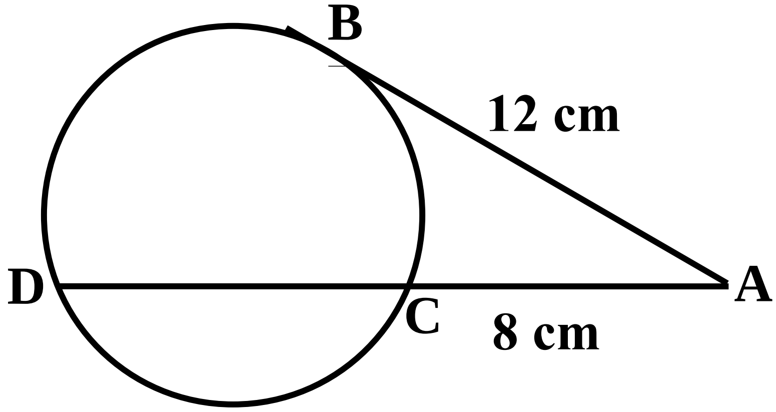




[73]

$\overline{AB}$ is a tangent then

find the length of $\overline{CD}$



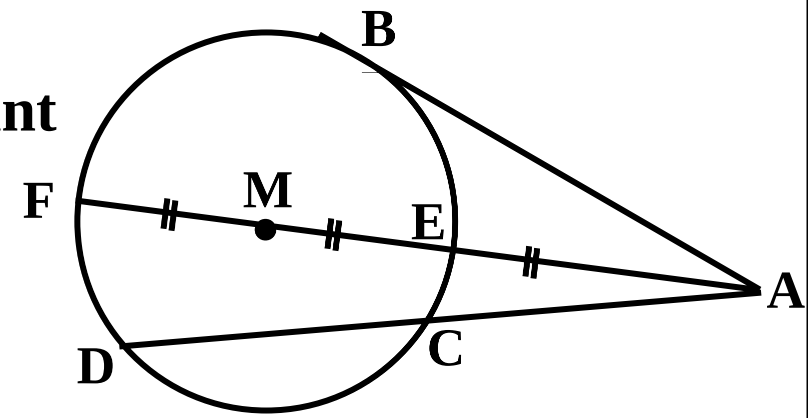
[74]

1) Prove that:

$AC \times AD = \text{constant}$

2) Find the length

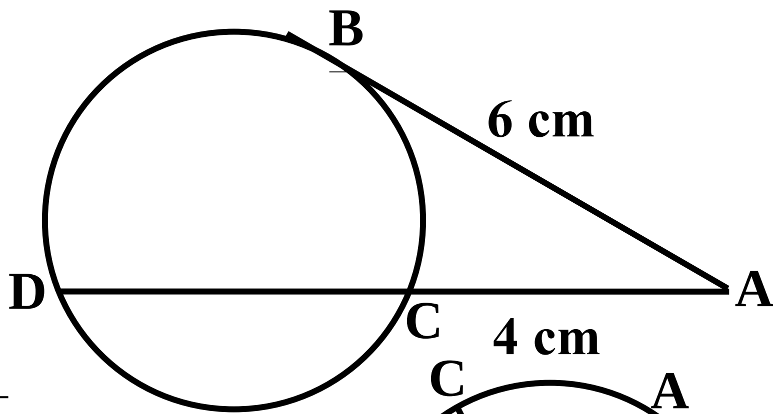
of $\overline{AB}$



[75]

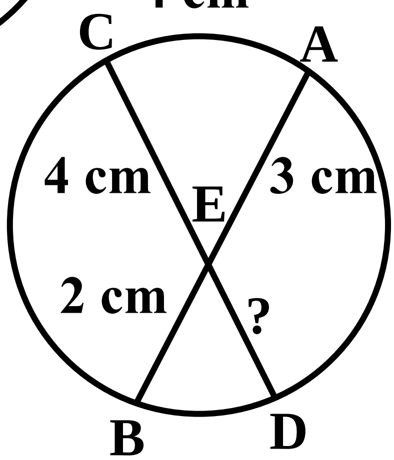
$\overline{AB}$ is a tangent then

find the length of $\overline{CD}$



[76]

Find the length of $\overline{ED}$



[*77] Complete:

1) If one of a line segment lies on the center of the circle and the other end on the circle , then this line segment is called …………

2) If the two ends of a line segment lie on the circle , then this line segment is called ………

3) The chord which passes through the center of the circle is called ……….

4) The longest chord of the circle is called ……….

5) The circle has ……… number of axes of symmetry.

6) In any circle the perpendicular straight line on any chord from its midpoint is ……… to the circle.

7) The circle divides the plane into ……… sets of points.

8) The perpendicular straight line on the diameter from one end is ………..

9) The two tangents to a circle at the two end points of the diameter are ………

10) The equal chords in length of a circle are equidistant from ………

11) The chords of a circle are equidistant from its centre are ……….

12) If the point A lies outside the circle M of radius length is r , then MA ……… r

13) The line of centre of two intersecting circle is ……. , ………

14) If the surface of the circle M $\cap$ the surface of the circle N = $\varnothing$, then the two circles M and N are ....

15) If the surface of the circle M $\cap$ the surface of the circle N = $\{A\}$ then the two circles M and N are ......

16) The number of circles can be drawn passing through two given points in the plane equals …….

17) If two circles have three common points , then they are ………..

18) The radius length of the smallest circle drawn to passing through two given points in the plane equals ………..

19) The point of intersection of the symmetric axes of the sides of a triangle is ………..

20) If M is a circle of radius length is r , A is a point in the plane of the circle :

1) If MA = $\frac{1}{2}$ r , then A .... the circle

2) If MA = r , then A .... the circle

3) If MA = 3 r , then A .... the circle

[*78] Match from the column (X) to the column (Y) to get a true statement two circles M , N of radii lengths are 8 cm. and 6 cm. :

X	Y
1) If : MN = 1 cm.	a) M , N are two intersecting circles
2) If : MN = 2 cm.	b) M , N are two distant circles.
3) If : MN = 7 cm.	c) M , N touching externally.
4) If : MN = 14 cm.	d) M , N are interior circles.
5) If : MN = 15 cm.	e) M , N touching internally.

[*79] Choose the correct answer from those given:

1) If the length of a diameter of a circle is 7 cm. and the straight line L at distance 3.5 cm. from its centre , then L is ………..

a) Secant to the circle at two points.
b) Outside the circle
c) Tangent to the circle
d) Axis of symmetry to the circle.

2) If the point A belongs to the circle M of diameter length 6 cm. , then MA equals ....

a) 3 cm b) 4 cm c) 5 cm d) 6 cm

3) If the straight line L is a tangent to the circle M of diameter length 8 cm. , then the distance between L and its centre equals ....

a) 3 cm b) 4 cm c) 6 cm d) 8 cm

4) If the straight line L is outside a circle of radius length 3 cm. and its centre M , if L at distance x from its centre , then $x \in$ ....

a) $]3 , \infty[$ b) $[3 , \infty[$ c) $[6 , \infty[$ d) $]-\infty , -6]$

5) If the straight line L at distance x from the centre of the circle M whose radius length r , $x \in\ ]0 , r[$, then L ....

a) intersects the circle
b) touches the circle
c) lies outside the circle
d) passes through the centre of the circle

6) If the length of the perpendicular drawn from the centre of the circle on the straight line L equals 6 cm. and the radius length of this circle = 6 cm. , then L length r , x $\in$ $]0 , r[$, then L ....

a) intersects the circle

b) touches the circle

c) lies outside the circle

d) passes through the centre of the circle

7) Which of the following points does not belong to the circle that its center is the origin and its radius length 7 cm.?

a) $(0 , 7)$ b) $(0 , -7)$ c) $(7 , 0)$ d) $(7 , 7)$

8) The number of the circles can be drawn to pass through the end points of the line segment $\overline{AB}$ equals...........

a) 1   b) 2   c) 3   d) an infinite number

9) If the circle M $\cap$ the circle N = $\{A , B\}$, then the two circles M and N are ....

a) distant.   b) concentric.

c) touching externally.   d) intersecting.

10) If the two circles M , N are touching externally , the radius length of one of them 5 cm. and MN = 9 cm. , then the radius length of the other circle = …….. cm.

a) 3   b) 4   c) 7   d) 14

11) If the two circles M , N are touching internally , the radius length of one of them 3 cm. and MN = 8 cm. , then the radius length of the other circle = …….. cm.

a) 5   b) 6   c) 11   d) 12

12) M and N are two intersecting circles their radii lengths are 5 cm , 2 cm , then MN $\in$ .....

a) $]3 , 7[$ b) $[3 , 7[$ c) $]3 , 7]$ d) $[3 , 7]$

13) The number of the circles that passes through three collinear points equals ……..

a) zero b) one c) three d) an infinite number

14) The symmetric axis of the common chord $\overline{AB}$ to the two intersecting circles M , N is ....

a) $\overleftrightarrow{MA}$ b) $\overleftrightarrow{MB}$ c) $\overleftrightarrow{MN}$ d) $\overleftrightarrow{NA}$

16) The number of the circles which passes through three non collinear points equals ……..

a) 0 b) 1 c) 2 d) 3

17) The center of the circumcircle of any triangle is the point of intersection of its ……..

a) Interior bisectors of its angles.
b) Exterior bisectors of its angles.
c) Its heights.
d) Symmetric axes of its sides.

18) If the two points A , B lie on a plane , AB = 4 cm. , then the length of the radius of the smallest circle passes through A and B equals ………

a) 2 cm. b) 3 cm. c) 4 cm. d) 8 cm.

19) If the two points A , B lie on a plane , AB = 6 cm. , then the number of circle each of them has a radius length 5 cm. and passes through A and B equals …..

a) 0 b) 1 c) 2 d) an infinite number

[*80] Complete:

1) The chords which opposite to equal arcs in measure in any circle are ……….

2) The measure of the inscribed angle equals half the measure of ....

3) The quadrilateral is said to be a cyclic quadrilateral if the measure of an exterior angle at any vertex equals the .... of the angle which opposite to its adjacent.

4) The two parallel chords in a circle intercept two arcs ....

5) The measure of an arc of a circle equals double ....

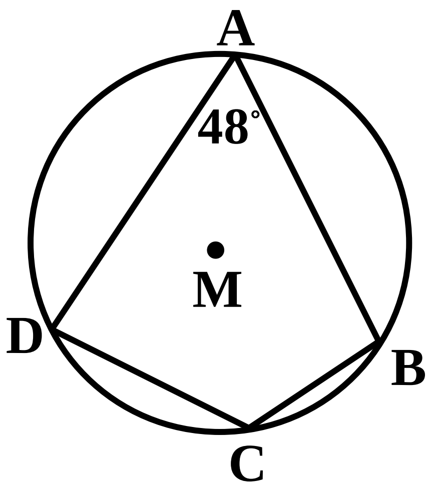
6) The two inscribed angles subtended on the same arc in a circle are ....

7) The altitude of any triangle are ....

8) The measure of the angle of tangency equals .... the central angle on its common arc.

9) The number of all common tangents drawn to two distant circles equals ....

10) The center of the inscribed circle of any triangle id the point of intersection of ....



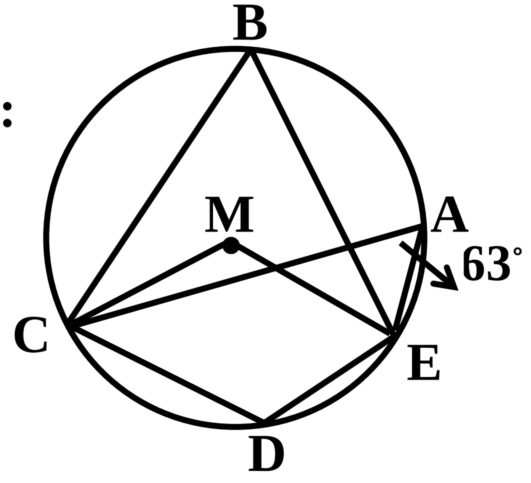
11) In the opposite figure:

In a circle M , $m(\angle A) = 48^\circ$, then :

a) $m(\angle C) =$ ....

b) $m\left(\overset{\frown}{BD}\right) =$ .... ,

" BD is the major arc "



12) In the opposite figure:

In a circle M , $m(\angle CAE) = 63^\circ$, then :

a) $m(\angle EBC) =$ ....

b) $m(\angle EMC) =$ ....

c) $m(\angle EDC) =$ ....

13) In the opposite figure:

In a circle M , $\overline{AB}$ is a diameter , $\overleftrightarrow{CD}$ is a tangent at D

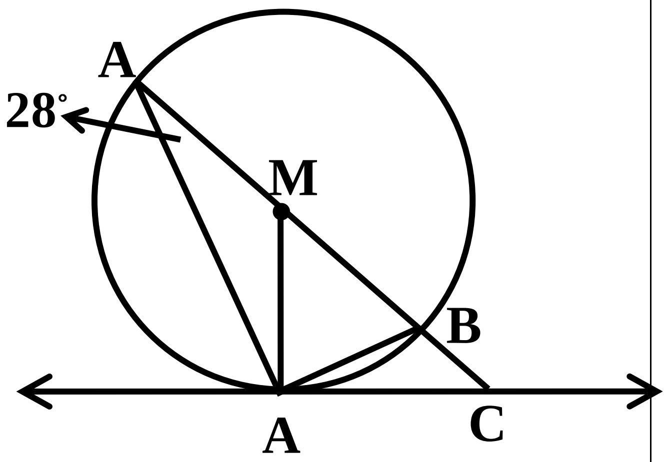
, $m(\angle BAD) = 28^\circ$, then :

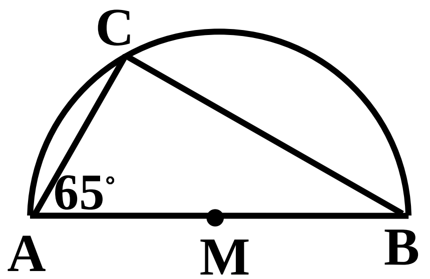
a) $m(\angle BDM) = ...^\circ$

b) $m(\angle BMD) = ...^\circ$

c) $m(\angle BDC) = ...^\circ$

d) $m(\angle BDC) = ...^\circ$





14) In the opposite figure:

$m(\angle A) = 65^\circ$

then $m(\angle B) = ...^\circ$

15) In the opposite figure:

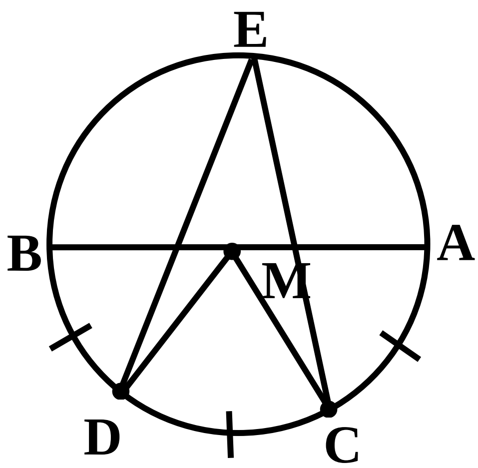
$\overline{AB}$ is a diameter ,

$m(\widehat{AC}) = m(\widehat{CD})$

$= m(\widehat{DB})$ then :

a) $m(\angle DMC) = ...^\circ$

b) $m(\angle DEC) = ...^\circ$



[*81] Choose the correct answer from those given:

1) The two opposite angles in the cyclic quadrilateral are …………. a) equal b) complementary c) Supplementary d) alternate

2) The inscribed angle which opposite to the minor arc in a circle is …….. a) reflex b) right

c) Obtuse d) acute

3) The two tangents drawn from a point outside a circle are ……. a) equal in length b) parallel
c) Not equal in length d) orthogonal

4) The angle of tangency included between ……..
a) two chords b) two tangents
c) chord and tangent d) chord and diameter

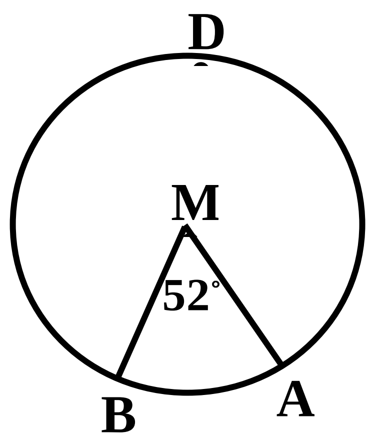
5) The number of tangents can be drawn from a point lies on a circle equals ……… a) 1 b) 2
c) 4 d) an infinite number

6) The number of common tangents can be drawn to two concentric circles equals ……….
a) 0 b) 1 c) 2 d) 3

7) The number of common tangents can be drawn to touching internally circles equals ………
a) 1 b) 2 c)3 d) 4

8) It is possible to draw a circle passing through the vertices of a ……… a) trapezium b) rhombus
c) parallelogram d) rectangle

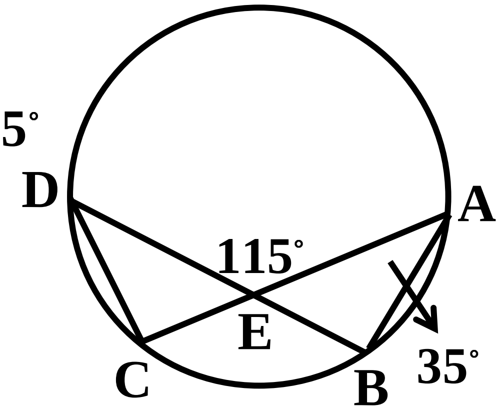
9) In the opposite figure :
In a circle M , $m(\angle AMB) = 52^\circ$
then : $m(\widehat{ADB}) = ...^\circ$
a) 52 b) 104
c) 128 d) 308



10) In the opposite figure:

$\overline{AC}$, $\overline{BD}$ are two iintersecting chords in a circle M , if $m(\angle A) = 35^\circ$ and $m(\angle AED) = 115^\circ$, then $m(\overset{\frown}{AD}) = ...^\circ$

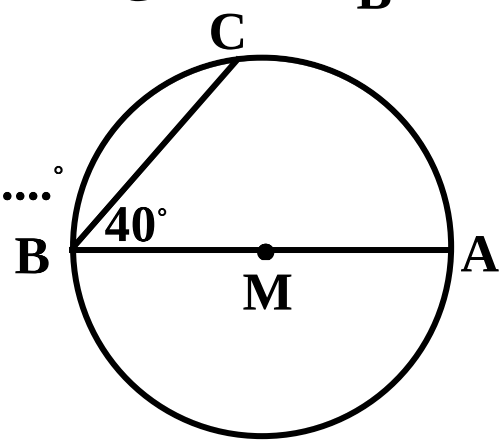
a) 70 b) 80 c) 115 d) 160



11) In the opposite figure:

$\overline{AB}$ is a diameter in a circle M , $m(\angle ABC) = 40^\circ$, then $m(\overset{\frown}{BC}) = ...^\circ$

a) 40 b) 50 c) 90 d) 100



12) In the opposite figure:

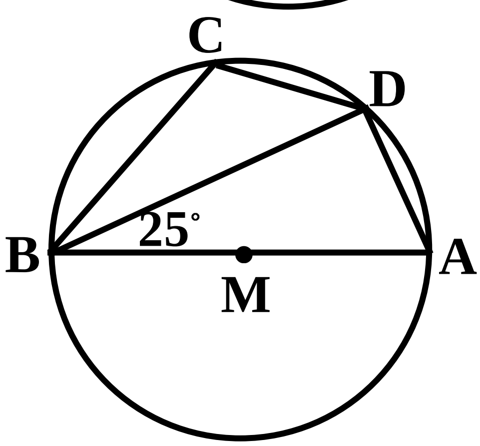
$\overline{AB}$ is a diameter in a circle M , $m(\angle ABD) = 25^\circ$, then :

First) $m(\angle DAB) = ...^\circ$

a) 25 b) 50 c) 65 d) 90

Second) $m(\angle DCB) = ...^\circ$

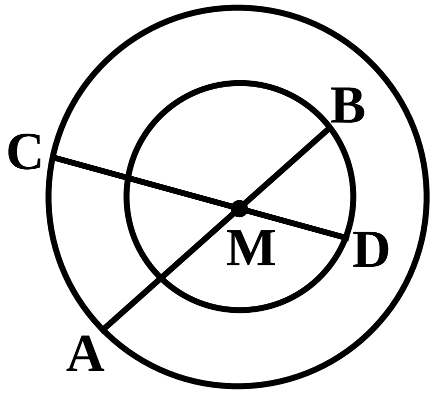
a) 50 b) 100 c) 115 d) 125



13) In the opposite figure:

Two concentric circles at M , $\overline{AB} \cap \overline{CD} = \{M\}$ if $m(\overset{\frown}{BD}) = 80^\circ$ then $m(\overset{\frown}{AC}) = ...^\circ$

a) 40 b) 80
c) 100 d) 160



14) In the opposite figure:

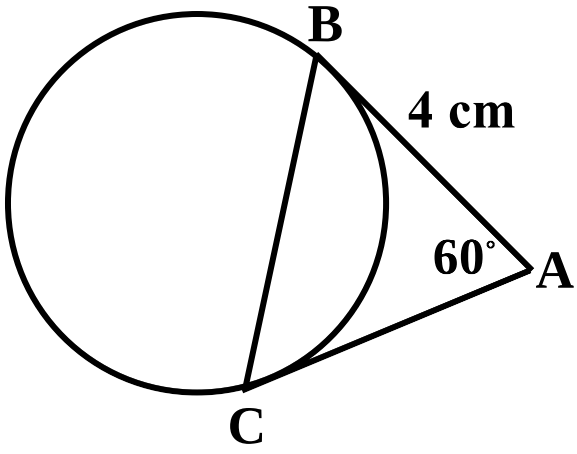
$\overrightarrow{AB}$, $\overrightarrow{AC}$ are two tangents

, $m(\angle A) = 60^\circ$, if AB = 4 cm.

then the length of

$\overline{CB}$ = ... cm

a) 3 b) 4 c) 5 d) 8



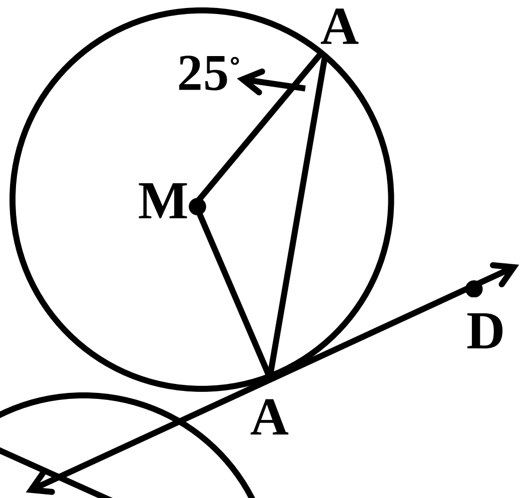
15) In the opposite figure:

If $\overleftrightarrow{BD}$ is a tangent to the circle M

$m(\angle BAM)$=25°, then

$m(\angle ABD)$=.......°

a) 25 b) 50 c) 65 d) 130



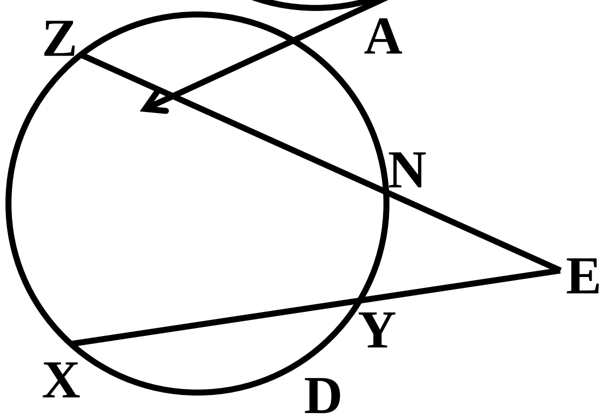
16) In the opposite figure:

If $m(\overset{\frown}{XZ}) = 70^\circ$

,$m(\overset{\frown}{YN}) = 30^\circ$ then

$m(\angle E)$ = ...°

a) 20 b) 40 c) 50 d) 100



17) In the opposite figure:

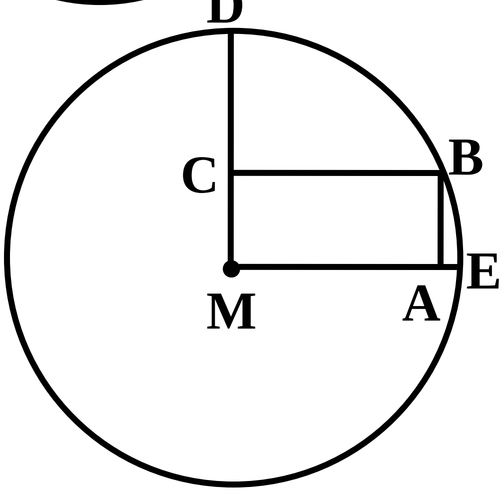
BAMC is a rectangle

, ME = 4 cm , CD = 1 cm

, then MC = ... cm.

a) 3 b) 4

c) 5 d) 7



[*82] **Choose the following figures choose the correct answer:**

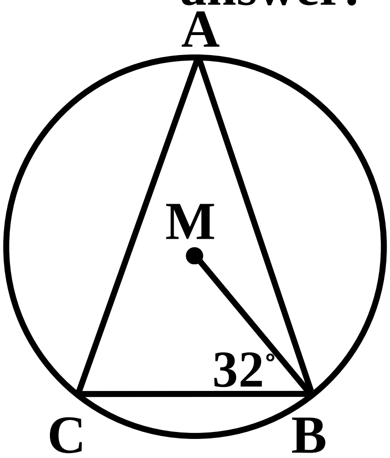


Figure (1)

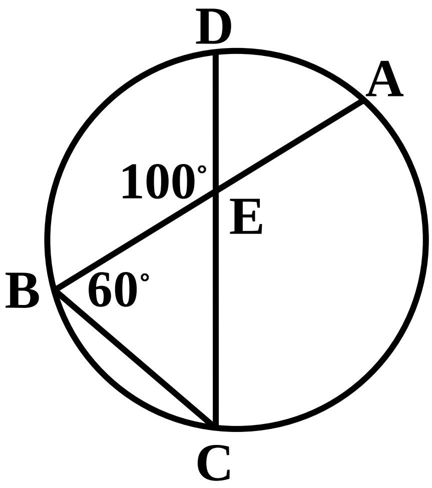


Figure (2)

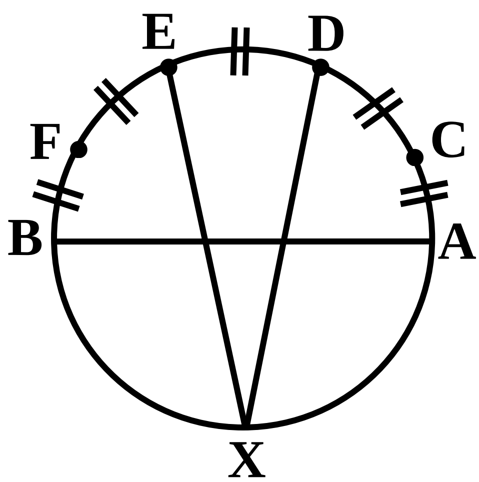


Figure (3)

Figure. (1) :

A circle of centre M , $m(\angle MBC) = 32^\circ$

, then $m(BC) = ...^\circ$

a) 16 b) 32 c) 64 d) 116

Figure. (2) :

$\overline{AB}$, $\overline{CD}$ are two intersecting chords in a circle , then $m(\angle DAB) = ...^\circ$

a) 40 b) 50 c) 60 d) 70

Figure. (3) :

$\overline{AB}$ is a diameter in a circle , $m(AC) = m(CD)$

$= m(DE) = m(EF) = m(FB)$, then $m(\angle DXE) = ...^\circ$

a) 18 b) 36 c) 54 d) 72

[*83] **Using the following figures choose the correct answer:**

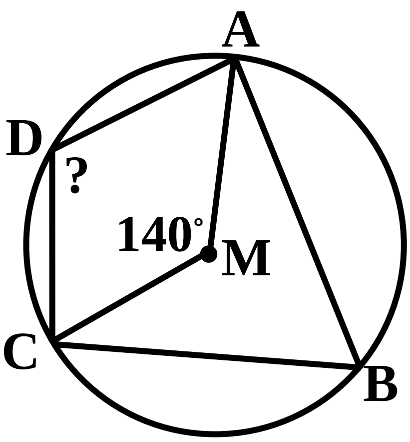


Figure (1)

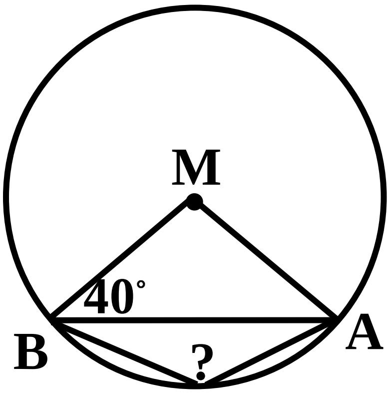


Figure (2)

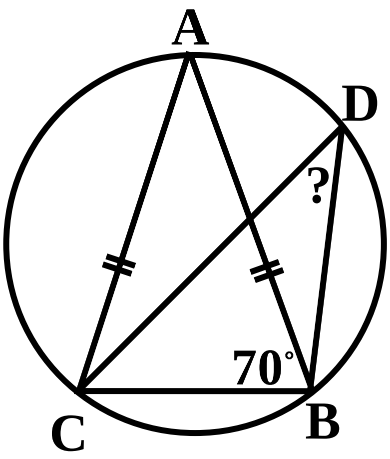


Figure (3)

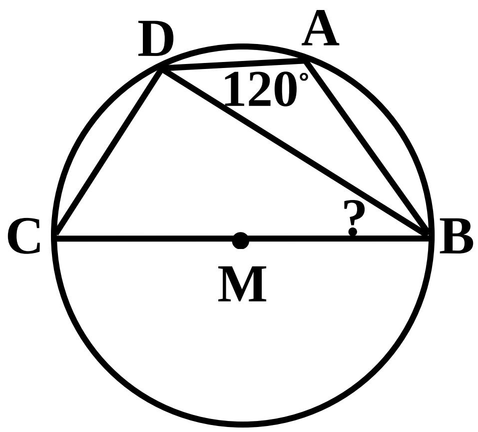


Figure (4)

Figure. (1) :

A circle of centre M , $m(\angle AMC) = 140^\circ$

then $m(\angle ADC) = ...^\circ$

a) 40 b) 70 c) 110 d) 140

Figure. (2) :

If $m(\angle ABM) = 140^\circ$, then $m(\angle ACB) = ...^\circ$

a) 80 b) 100 c) 130 d) 140

Figure. (3) :

If $m(\angle ABC) = 70^\circ$, then $m(\angle BDC) = ...^\circ$

a) 20 b) 40 c) 60 d) 90

Figure. (4) :

If $m(\angle BAD) = 120^\circ$, then $m(\angle CBD) = ...^\circ$

a) 15 b) 30 c) 45 d) 60

[*84] In the opposite figure:

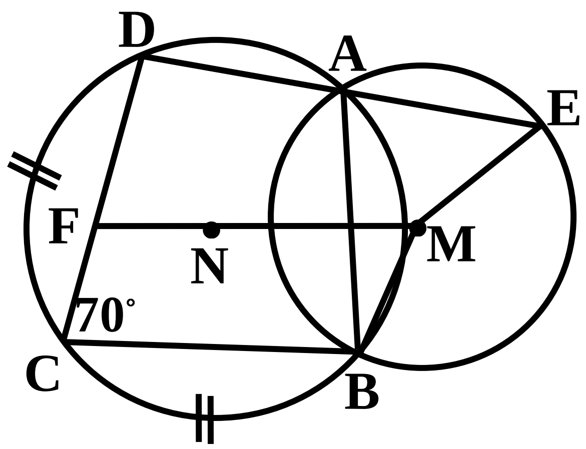
$m(\angle C) = 70^\circ$, the length of CD = the length of BC

$\overrightarrow{MN} \cap \overline{CD} = \{F\}$ and

$\overrightarrow{DA} \cap$ the circle M = $\{A , E\}$

Find : $m(\angle BDC)$

, $m(\angle BAD)$ and $m(\angle BME)$

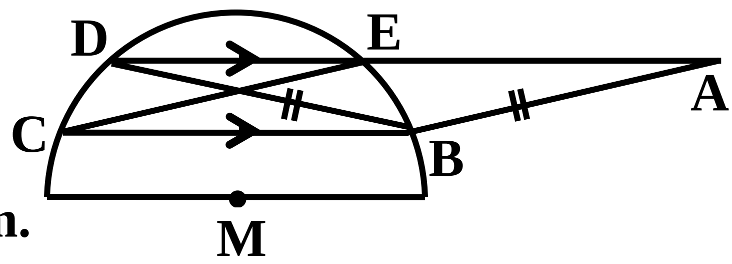


[*85] In the opposite figure:

A semicircle of centre M , $\overline{AD} // \overline{BC}$

Prove that :

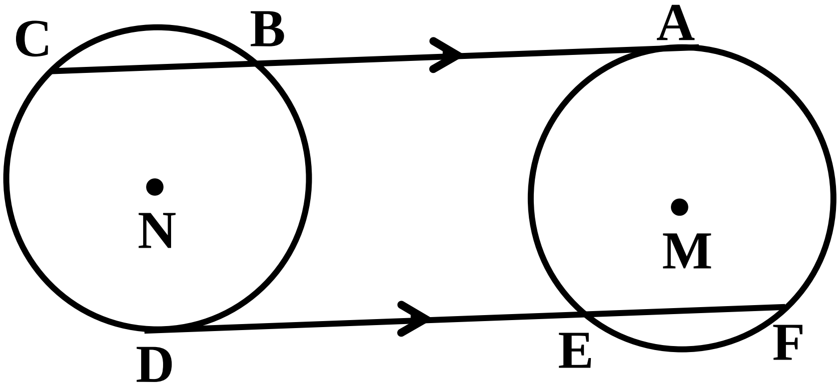
ABCE is a parallelogram.



[*86] **In the opposite figure:**

M , N are two congruent circles , $\overline{AC}$ is a tangent to the circle M at A , $\overline{DF}$ is a tangent to the circle N at D , $\overline{AC}$ // $\overline{DF}$

prove that : 1) BC = EF 2) AB = ED



[*86] **In the opposite figure:**

M , N are two intersecting circles , $\overline{CD}$ is a chord in the circle M , cuts $\overleftrightarrow{MN}$ at E ,

if E is the midpoint of $\overline{CD}$

Prove that : $\overline{AB}$ // $\overline{CD}$